



E S S A Y S

M E D I C A L

A N D

E X P E R I M E N T A L.

V O L. II.



ESSAYS

MEDICAL

AND

EXPERIMENTAL

VOL. II

ESSAYS

MEDICAL AND EXPERIMENTAL,

ON THE

Following SUBJECTS;

- | | |
|-----------------------------|-----------------------------------|
| 1. On the COLUMBO ROOT. | 5. On the antiseptic and sweeten- |
| 2. On the ORCHIS ROOT. | ing powers, and on the varie- |
| 3. On the WATERS of BUXTON | ties of FACTITIOUS AIR. |
| and MATLOCK in Derbyshire. | 6. On the Noxious Vapours of |
| 4. On the Medicinal Uses of | CHARCOAL. |
| FIXED AIR. | 7. On the ATRABILIS. |
| | 8. On SEA SALT. |
| | 9. On COFFEE. |

TO WHICH ARE ADDED,

SELECT HISTORIES OF DISEASES,

WITH REMARKS; AND

PROPOSALS FOR ESTABLISHING MORE ACCURATE AND
COMPREHENSIVE BILLS OF MORTALITY.

BY

THOMAS PERCIVAL, M.D.F.R.S. & S.A.

——— *Sicut formica,*

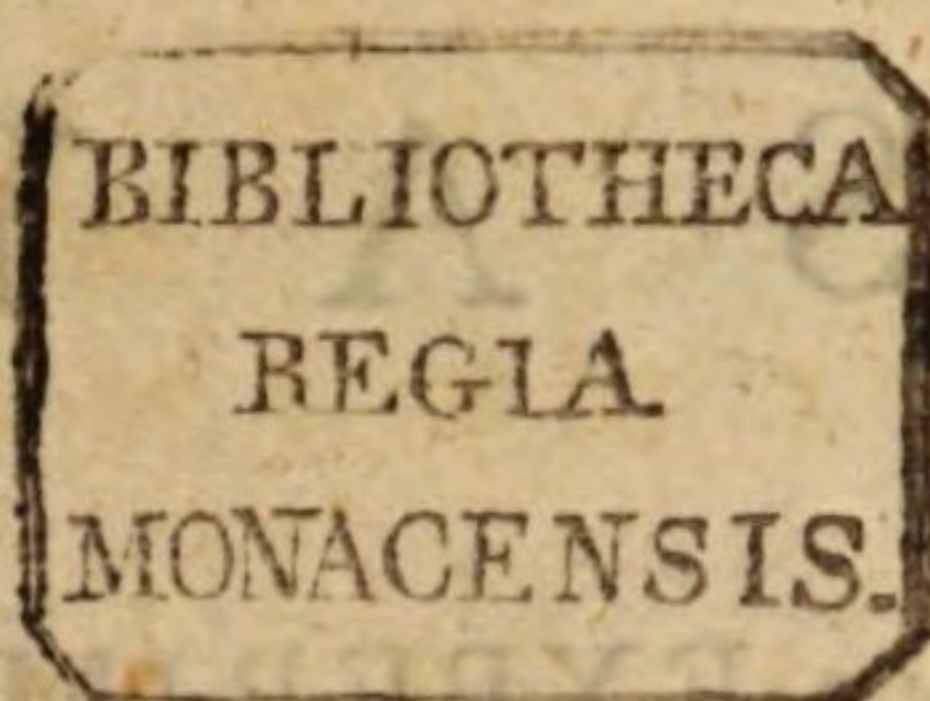
Ore trahit quodcunque potest atque addit acervo.

HOR. Lib. 1. Sat. 1.

L O N D O N:

Printed for JOSEPH JOHNSON, No. 72, St. Paul's Church-Yard.

MDCCLXXIII.



MEDICAL AND EXPERIMENTAL

Following Subjects

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| 1. On the COLONIAL ROOT. | 5. On the antiseptic and preservative |
| 2. On the ORCHID ROOT. | 6. On the antiseptic and preservative |
| 3. On the W. part of BUXTON. | 7. On the antiseptic and preservative |
| 4. On the MEDICAL USE of | 8. On the antiseptic and preservative |
| FIXED AIR. | 9. On the antiseptic and preservative |
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Second Edition

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Price, 10s. 6d.

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MDCCLXXXIII.

THE
FOLLOWING
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ARE INSCRIBED
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AS A TRIBUTE
OF
ESTEEM, RESPECT, AND GRATITUDE,
BY
HIS LORDSHIP'S
MOST OBLIGED
AND MOST OBEDIENT SERVANT,
THOMAS PERCIVAL.

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P R E F A C E.

THE great Lord Verulam recommends the collecting of facts, observations, and experiments, as the best method of promoting the improvement of physic; and experience hath fully evinced the utility of such a plan. In this way I am ambitious of contributing my mite to the general stock of medical

viii P R E F A C E.

knowledge ; and shall think myself happy, if I can thus render the pursuit of my own instruction and amusement, subservient to the interests of my profession, and to the general good of mankind.

THE Observations on the COLUMBO ROOT have been read at the College of Physicians, and before the Royal Society ; and have been communicated to a considerable number of my friends and correspondents, to some of whom this remedy was unknown, and by others applied only to the cure of the *cholera morbus*. During the course of the

P R E F A C E. ix

the last year, I have had the satisfaction of receiving from them the strongest testimonies of its efficacy, in a variety of disorders. What I have advanced, therefore, in its favour, may be regarded, not as the conclusions of an individual, partial to a favourite remedy, but as facts supported by the experience of many learned and ingenious Physicians.

THE dissertation on the ORCHIS ROOT has been honoured, by Doctor Hunter of York, with a place in the Georgical Essays, a useful and entertaining work on the subject of agriculture. But as it contains some experiments and observations on the medicinal qualities

ties, as well as on the culture and preparation of this root, it is here reprinted, with a few corrections and additions.

THE papers on FACTITIOUS AIR form a part of an experimental inquiry into this interesting and curious branch of physics ; in which the friendship, and too favourable opinion of Dr. Priestley first engaged me, in concert with himself. But this learned philosopher, who possesses a happier genius, more leisure, and better health than I am blest with, has carried his researches far beyond the limits of mine ; and his pleasing and wonderful discoveries in these almost trackless paths of science, will reflect

flect the highest honour on his industry and abilities.

To this second volume of Experimental Essays, I have annexed a few select HISTORIES of DISEASES, agreeable to the plan of Lord Bacon, who advises Physicians “to revive the Hippocratic method of composing narratives of particular cases, in which the nature of the disease, the manner of treating it, and the consequences are to be specified; to attempt the cure of those diseases, which have been too boldly pronounced incurable; and to extend their inquiries into the powers of particular medicines, in the cure of particular disorders.” (a)

THE

(a) De Augment. scient. l. iv. cap. 2.

THE PROPOSALS for establishing more accurate and comprehensive BILLS of MORTALITY, were suggested by the perusal of a Treatise on Reversionary Payments, lately published by my friend Dr. Price; who employs his great mathematical knowledge, not in idle speculation, or in the solution of amusing problems, but in disquisitions at once curious, instructive, and of the highest importance to the interests of mankind. The Plan has been honoured with his approbation, and is likely to be carried into immediate execution at Manchester.

I CANNOT take my leave of the candid reader without intimating

P R E F A C E. xiii

ing, that though the experiments contained in these sheets were made with great care, and are related with the strictest fidelity, I am sensible many inaccuracies may have escaped me; which those will most readily excuse, who have experienced the difficulties incident to such researches. The Philosopher has frequent occasion to lament both the fallacy of his senses, and the limited powers of his understanding. “ You will wonder, says Mr. Boyle, in the preface to his philosophical Essays, that I should use so often *perhaps, it seems, 'tis not improbable,* words which argue a diffidence of the truth of the opinions I incline to. But I have hitherto not unfrequently

quently found that what pleased me for a while, was soon after disgraced by some further, or new experiment." Such is the imperfection of human knowledge, even when derived from evidence, which is usually regarded as the most clear, and incontestible. And so true is the sentiment of the comic poet,

*Nunquam quisquam ita bene subducta ratione
ad vitam fuit,
Quin res, ætas, usus aliquid apportet novi,
Aliquid admoneat, ut illa quæ te scire cre-
das, nescias,
Et quæ tibi putaris prima in experiundo
repudies.*

TERENT.

MANCHESTER,
1st Jan. 1773.

THE

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EXPERIMENTS
AND
OBSERVATIONS
ON THE
COLUMBO-ROOT.

B

— *Symbolum aliquid, utcunque exiguum,
in commune medicinæ ærarium contribu-
erem.*

SYDENHAM.



OBSERVATIONS AND EXPERIMENTS

ON THE

COLUMBO-ROOT.

THE Columbo-root, though a medicine of considerable efficacy, is not so generally known in practice as it deserves to be. Books, so far as my reading extends, are silent about it; and I have not hitherto been able to obtain any satisfactory information concerning its Natural History. The celebrated Linnæus is unacquainted with it. Dr. Watson made particular enquiry concerning it of an East-India Governor, and also of Mr. Loten, who was several years Governor of Ceylon. These Gentlemen

informed him only that the root was brought to Ceylon, and to our settlements, where it is called in the Portuguese language *Raijs de Mosambique*. Doctor Hope, Professor of Botany at Edinburgh, has transmitted to me the following account, which he received from Dr. Rainey, a Physician who resided a long time in the East-Indies. The Columbo-root grew originally on the continent of Asia, and was from thence transplanted to Columbo, a town in Ceylon, which now gives name to it, and supplies all India with it. The inhabitants of these countries have for a long time used it in disorders of the stomach and bowels. They carry it about with them, and take it sliced or scraped, in Madeira wine.

THE Columbo-root comes to us in circular pieces, which are from half an inch to three inches in diameter; and divided into *frusta*, which measure in length from two inches to one quarter of an inch.

COLUMBO-ROOT.

5

inch. The sides are covered with a thick, corrugated bark, of a dark brown hue on its external coat, but internally of a light yellow colour. The surfaces of the transverse sections appear very unequal, highest at the edges, and forming a concavity towards the centre. On separating this surface, the root is evidently seen to consist of three *lamina*, viz. the cortical, which in the larger roots is a quarter of an inch thick; the ligneous, about half an inch; and the medullary which forms the center, and is near an inch in diameter. This last is much softer than the other parts, and when chewed seems very mucilaginous: A number of small fibres run longitudinally through it, and appear on the surface. The cortical and ligneous parts are divided by a circular black line. All the thicker pieces have small holes drilled through them, for the convenience of drying.

THIS root has an aromatic smell, but

B 3

is

is disagreeably bitter and slightly pungent to the taste, somewhat resembling mustard-seed, when it has lost by long keeping part of its essential oil. Yet though ungrateful to the taste, when received into the stomach it appears to be corroborant, antiseptic, sedative, and powerfully antiemetic.

IN the CHOLERA MORBUS it alleviates the violent *tormina*, checks the purging and vomiting, corrects the putrid tendency of the bile, quiets the inordinate motions of the bowels, and speedily recruits the exhausted strength of the patient. Mr. Johnson of Chester, a surgeon of eminence, who served ten years on board one of his Majesty's ships in the East Indies, and in 1756 had the care of an hospital-ship, gave the Columbo-root in that climate to a great number of patients, often twenty in a day, attacked with this disease. He seldom employed any means to promote the discharge of bile, or to cleanse

cleanse the stomach and bowels, previous to its exhibition : And he generally found that it soon stopped the vomiting, which was the most fatal symptom, and that the purging and remaining complaints, quickly yielded to the same remedy. The mortality on board his ship, after he used this medicine, was remarkably less than in the other ships of the same fleet ; and this difference he attributes entirely to the good effects of the Columbo-root in this fatal disorder. The dose he gave was from half a drachm to two drachms of the powder, every three or four hours, more or less according to the urgency of the symptoms.

THOUGH Columbo-root does not seem to possess much, if any degree of astringency, yet I have often observed very salutary effects from its use, in DIARRHOEAS, and even in the DYSENTERY. In the first stage of these disorders, when astringents would be hurtful, this root

may be prescribed with safety and advantage, for by its antispasmodic powers, it corrects the irregular action of the *primæ viæ*. But as a cordial, tonic, and antiseptic remedy, it answers better when given towards their decline.

I HAVE more than once experienced its efficacy in the vomitings which attend the BILIOUS CHOLIC; and in such cases where an emetic is thought necessary, after administering a small dose of ipecacuan, the stomach may be washed with an infusion of Columbo-root. This will answer the purposes of an evacuant, as well as chamomile tea, and will tend to prevent those violent and convulsive reachings which in irritable habits, abounding with bile, are sometimes excited by the mildest emetic. The efficacy of ipecacuan in the cholic, given in small doses, is well known; and perhaps its operation as an antispasmodic may in some measure depend on the nausea which it produces.

But

COLUMBO-ROOT. 9

But unfortunately it often occasions very severe sickness and vomiting, and thus aggravates the disorder, by inducing a new and most distressing symptom. Perhaps (for I speak not from experience) if it were combined with some grateful aromatic, and administered in an infusion of Columbo, prepared with mint water, this troublesome effect might be obviated.

IN BILIOUS FEVERS, fifteen or twenty grains of this root, with an equal or double quantity of vitriolated tartar, given every four, five, or six hours, produce very beneficial effects. The neutral salt abates the febrile heat, allays thirst, and brings on a gentle salutary *diarrhœa*; whilst the Columbo-root supports the strength of the patient, obviates the nausea and sickness to which he is so much disposed, and powerfully checks the septic ferment in the *primæ viæ*. When the belly is sufficiently soluble, an infusion of it may be directed, well acidulated

lated with *elixir vitriol. dulc.** Is it not probable, that the Columbo may be highly serviceable in the malignant, YELLOW FEVER of the West-Indies? This fever is always attended with great sickness, violent reachings, and a copious discharge of bile. The vomiting recurs at

* DR. HAYGARTH, a very ingenious Physician at Chester, has lately by my recommendation, made trial of the Columbo-root, in a fever of the bilious kind, which has been epidemic at Namptwich, and in other parts of Cheshire; and he has favoured me with the following account of his success. “After the *primæ viæ* have been sufficiently unloaded of their bilious, and other putrescent contents, I find the Columbo-root a most useful remedy, in allaying the nausea and reachings, to which the patients are liable. In this fever, though the remissions are very evident, and the accessions generally marked with chills and other symptoms of an intermittent, yet the bark appears to do more harm than good, as it occasions an increase of feverish heat, and a parched tongue. The Columbo in these cases seems to supply its place most admirably, by correcting the bile, restoring the proper tone of the stomach, and of the whole habit. It also prevents relapses, to which in this fever, the patients are particularly disposed.”

“SUCH

COLUMBO-ROOT. 11

at short intervals, often becomes almost incessant, and an incredible quantity of bile is sometimes evacuated, in a few hours.

CHILDREN during DENTITION, are frequently subject to severe vomitings and diarrhœas. In these cases the Columbo-root is an useful remedy; and I have seen almost instant relief procured by it, when other efficacious medicines had been tried in vain. The more effectually to correct the acidities which at such times usually prevail, a little chalk or magnesia may be combined with it.

THE

“Such have been the good effects of the Columbo-root in the cases which have fallen under my own observation; but a judicious Apothecary informs me, that he has often seen it fail of success in this fever, which in no respect seems wonderful. It is not supposed that Columbo has any febrifuge quality, similar to antimony, or Peruvian bark. By correcting the putrid bile it destroys the *fomes* which aggravates the fever, and produces many of its most dangerous symptoms. When bilious fevers are epidemical, does it not seem a probable remedy to prevent the disease?”

THE Columbo-root is extremely beneficial in a LANGUID STATE of the STOMACH, attended with want of appetite, indigestion, nausea, and flatulence. It may be given either in substance, with some grateful aromatic, or infused in Madeira wine, and during the use of it, gentle doses of the tincture of rhubarb, or of any other strengthening and cordial purgative, should occasionally be prescribed. If the bile appear to be defective, a sufficient quantity of ox gall, carefully evaporated to the consistence of an extract, may be mixed with the powder of Columbo, and the mass reduced into pills. In this manner I have frequently taken the Columbo-root myself, and have generally found my appetite increased, and my digestion improved by it.

HABITUAL VOMITING, when it proceeds from a weakness or irritability of the stomach, from an irregular gout, from
acidities,

acidities, from acrimonious bile, or an increased and depraved secretion of the pancreatic juice, are greatly relieved by the use of Columbo-root, in conjunction with aromatics, chalybeates, or the testaceous powders. But this disease often arises, when such a cause is least suspected, from an affection of the kidneys. Under such circumstances, demulcents, and gentle diuretics, are the most successful remedies; though I have frequently observed temporary relief procured by a light infusion of this root in mint water.

SUCH an infusion succeeds better than any other medicine I have tried, in the nausea and vomiting occasioned by PREGNANCY. But it is sometimes necessary to premise venæsection, and always expedient to keep the patient's body moderately open with magnesia.

I COULD

I COULD illustrate the truth of these observations, by a variety of cases; but to enter into so minute a detail would be equally unnecessary and uninteresting. I shall confine myself therefore to the relation of a few histories, which exemplify the peculiar, or if the expression be allowable, specific qualities of the Columbo-root.

C A S E I.

T. H. of Newton-lane near Manchester, in the month of August 1770, from exposure to cold when overheated with hard labour, was attacked with a severe purging and vomiting, accompanied with violent pain in his stomach and bowels. He continued in this miserable condition twenty-four hours before I saw him, and his strength was then nearly exhausted. I directed two scruples of the powder of Columbo-

Columbo-root, to be given every three or four hours in pepper-mint water. This remedy afforded almost immediate relief; but the patient returning too soon to his occupation, had a relapse, and was again restored to health by the same medicine.

* C A S E II.

W. W. August 31. 1770, had been seized with a looseness three days before, which had gradually increased, and for the last four hours, been most violent, attended with frequent vomiting, and cramps in his extremities. He was directed to take a scruple of the powder of Columbo every two hours, and had neither vomiting, nor purging after the first dose. Nine doses restored him to perfect health.

* Communicated by Dr Haygarth.

CASE

* CASE III.

APRIL, 1771. Mrs. P—— about the beginning of the third week of her confinement in child-bed, began to complain of great pain, fullness, and uneasiness in the bowels, accompanied with frequent and copious evacuations by stool. What was discharged had the colour and consistence of cream. The pulse was from 100 to 115. The tongue had a whitish fur; and the skin was often dry and hot. The evacuations by stool, and the other symptoms were always much more considerable during the night, than in the day. Ipecacuanha as an emetic, opiates, elixir of vitriol, and other cooling restraints, afforded no relief. A strong infusion of the Columbo-root in cinnamon tea, was then given with the desired effect. After every tea-cup full of the infusion

* Communicated by Dr. Dobson of Liverpool.

fusion the patient found herself better; the painful sensations were relieved, and the evacuations diminished. In about five days she was entirely cured.

C A S E IV.

R. N. Esq. aged 26, the latter end of June 1771, when the weather was extremely hot, was seized with the usual symptoms of a fever. An emetic and gentle cathartic were administered, and saline draughts were directed to be taken at proper intervals. He persisted in this course two or three days, without any sensible relief. A continual nausea, and frequent vomitings of green bile now came on. The skin was hot and dry; the pulse beat an hundred and twenty strokes in a minute; the tongue was foul; the belly not sufficiently soluble, notwithstanding the free use of strawberries, and other fruit was enjoined; and he com-
C plained

plained of great pain in his head and back, attended with universal lassitude. A clyster was immediately injected; and two scruples of vitriolated tartar were given every four hours, in three spoonful of the infusion of Columbo. The first dose almost instantly alleviated the nausea and sickness, and the continuance of the same remedy entirely prevented their return; whilst the gentle diarrhœa produced by the neutral salt, mitigated all the febrile symptoms. On the eleventh day he had two bloody stools, and as his constitution was feeble and relaxed, the Peruvian bark combined with astringents was administered without delay: The hæmorrhage was soon checked, and the patient gradually recovered his usual health and strength.

C A S E V.

JUNE 2d, 1771. Mr. W.'s son, aged 2, with other symptoms of dentition, had
severe

severe purging and vomiting, which continuing three days, reduced him to the lowest degree of weakness. I directed five grains of Columbo-root, and three grains of *pulv. e. cbel. c. c.* to be taken every two hours. The vomiting was stopped by the first dose; the looseness was soon after checked, and in two days the child recovered his usual strength.

I SHALL now proceed to relate the experiments which I have made on the Columbo-root.

EXPERIMENT I.

Two drachms of Columbo-root powdered, were infused without heat, in four ounces of each of the following *menstrua*.

1. Rectified spirit of wine.
 2. French brandy.
 3. Madeira wine.
 4. White wine.
 5. Distilled water.
 6. White wine vinegar.
 7. Hard spring water.
- After twenty

ty-four hours digestion, the tinctures, &c. were filtered through paper, and equal quantities of each, and of their respective *menstrua* were weighed with great exactness, and compared together. The tincture made with rectified spirit of wine, appeared by its taste, colour, and superior specific gravity to the simple spirit, to be considerably stronger than the rest; whose degree of impregnation, seemed by these tests, to be exactly in the order in which I have enumerated the several *menstrua* employed in their preparation. It should be remarked, that the watery infusion of Columbo-root is more perishable than that of other bitters. In twenty-four hours a copious precipitation takes place in it, and in two days it becomes rosy and even musty.

EXPERIMENT II.

THE addition of orange peel renders the infusion of Columbo-root less ungrateful

grateful to the palate. An ounce of the powdered root, half an ounce of orange-peel, two ounces of French brandy, and fourteen ounces of water, macerated twelve hours without heat, and then filtered through paper, afforded a sufficiently strong, and tolerably pleasant infusion.

EXPERIMENT III.

TWELVE ounces of Columbo-root in gross powder were digested four days in three pints of rectified spirit of wine. The tincture was then filtered; and the *residuum* boiled repeatedly in a sufficient quantity of water, till it yielded no taste to the liquor. The decoctions, having been carefully percolated, were evaporated over a gentle fire in the common method, till about three quarts only remained. The evaporation was then continued in the vapour bath, and when nearly finished, the tincture, from which a part of the

spirit had been previously drawn by the alembic, was gradually added, and the whole reduced to a pilular consistence, retaining the entire flavour of the Columbo, free from the least degree of *emphyreuma*, and weighing eight ounces and two drachms. The spirit distilled from the tincture was neither impregnated with the taste nor odour of the root; which is a proof that no volatile parts were dissipated by this process. This experiment was made at my request, by Mr. Henry, an ingenious and accurate Apothecary in Manchester. I have frequently used the extract of Columbo, and find it equal, if not superior in efficacy to the powder.

EXPERIMENT IV.

EQUAL weights, viz. about two drachms of beef, cut into small pieces, were macerated separately in an ounce of a cold infusion of the Peruvian bark, and of Columbo-

lumbo-root, filtered and prepared in a manner exactly similar. The experiment was made in the month of July, the weather was uncommonly warm, and the bottles were placed in a window which had a southern aspect. In forty-eight hours the beef in the infusion of Columbo-root had acquired a slightly putrid fœtor, whilst that in the infusion of bark remained perfectly sweet, and continued so ten hours longer. Two drachms of beef macerated in cold water, and intended for a standard, became putrid in twenty-four hours, under the circumstances above described.

EXPERIMENT V.

THE putrid beef employed as a standard in the last experiment, was divided into two equal parts, to one of which was added an ounce of the infusion of Columbo-root; to the other the same quan-

tity of the infusion of Peruvian bark. After six hours maceration, the pieces of flesh had lost much of their putrid fœtor; but that in the infusion of Columbo-root, was more offensive than the other.

EXPERIMENT VI.

To several phials, each containing three drachms of putrid ox gall, and two drachms of saliva, were added equal quantities, viz. an ounce of, 1. the infusion of Columbo-root; 2. the infusion of Peruvian bark; 3. the infusion of chamomile flowers; 4. spring water: the last was intended as a standard. The phials were placed in a water bath, heated to about 100 degrees of Fahrenheit's thermometer. When the infusion of bark was mixed with the putrid gall and saliva, it instantly produced a coagulation of the gall, and considerably increased the fœtor of it. Whereas the infusion of Columbo united perfectly with
it,

it, and very powerfully corrected its offensive smell. The infusion of chamomile occasioned no change in the bile, either with respect to its foetor or fluidity. After three hours digestion, the putrid smell of the gall was much abated, in all the phials but the standard, and even in that was less perceptible than at first. In six hours no foetor could be perceived, except in the standard; and the mixture with the bark had acquired a vinous smell, and emitted many air bubbles. In twelve hours the odour of the gall was sensible, but not offensive in the mixtures with Columbo and chamomile: The bark now fermented less, and had lost somewhat of its vinous smell. In twenty-four hours the standard became extremely putrid; the mixture with bark was sour; the Columbo and chamomile were still sweet; but in thirty hours they became putrid, and in forty hours they were highly offensive.

THE

THE instantaneous effect of the infusion of Columbo in correcting the putridity of the ox gall, serves in some measure to explain its action in the *cholera morbus*, and other diseases, attended with a redundancy and depravation of the bile: And at the same time it obviates all objection to the use of this remedy, previous to any artificial evacuations, in the first stage of such disorders; a practice which indeed is justified by its success. The coagulation and increased fœtor of the gall, which the infusion of bark occasioned, very well account for the disagreement of that medicine with the stomach in the yellow fever of the West-Indies. Doctor Hillary laments that though strongly indicated, it cannot be retained, even under the pleasantest form. Is it not probable that the Columbo-root, which so readily unites with, and so quickly sweetens putrid bile, would prove very salutary in this dangerous and malignant disease?

EXPE-

EXPERIMENT VII.

EQUAL quantities, viz. an ounce of water, of the infusions of Columbo-root, Peruvian bark, and chamomile flowers, were added to four phials, each containing three drachms of fresh ox gall, and two drachms of saliva. The bottles were then placed at such a distance from the fire, as to be kept blood-warm. In six hours all the mixtures except the standard, were in fermentation. The infusion of bark emitted most, and that of Columbo the fewest air bubbles: The former also had acquired a vinous smell. In twenty-four hours the standard became putrid. In forty-eight hours the infusion of bark was sour, that of chamomile slightly putrid; but that of Columbo-root was perfectly sweet, and continued so many hours afterwards, when the phials were set aside.

N. B. THE infusion of bark when
mixed

mixed with the recent gall produced a coagulation, but not in so great a degree as when combined with putrid bile.

SIR JOHN PRINGLE found that chamomile flowers resist the purefaction of animal flesh, more powerfully than Jesuit's bark; and from one of the preceding experiments it appears that in this respect, bark is more antiseptic than Columbo-root. But as a preservative of the *bile* from putridity, this root surpasses *chamomile flowers*, without producing like the bark any changes in it by fermentation. Hence may be justly inferred the utility of Columbo-root in disorders of a putrid tendency, and in an impaired digestion from corrupted bile, or vitiated and un-sound saliva.

EXPERIMENT VIII.

To determine the comparative action of Columbo-root, on the fermentation
of

of food in the stomach; I digested in the water bath three alimentary mixtures, prepared of two drachms of the crumb of bread, the same quantity of roasted mutton chopped very small, and an ounce of the infusions of Columbo-root, chamomile flowers, and mustard seed. The ingredients of each mixture were well united by triture in a mortar; and a fourth phial was provided as a standard, which contained the proportions before-mentioned of bread and mutton, with half an ounce of water, and the same quantity of saliva. In twelve hours the standard began to ferment; in thirty hours an intestine motion was perceptible in the other mixtures, but appeared to be least in the phial which contained the Columbo-root. In forty-eight hours the standard became sour. The third day the mixture with the infusion of chamomile was also sour. The two remaining phials, viz. the infusions of Columbo and of mustard, were now placed by the fire, where

where they continued ten days, without shewing the least signs either of acidity, or of putrefaction.

THE resemblance between the taste of mustard and of Columbo-root, induced me to try their comparative action on alimentary fermentation. And it appears that they concur in moderating, without suspending the process of digestion. This property gives Columbo-root the advantage over other bitters, in such disorders of the stomach, as are attended with a violent fermentation of the food, with flatulence, and great acidity. And if a stimulus be wanting to excite this organ to a quicker expulsion of its contents, some grateful aromatic may be combined with it: Or perhaps mustard-seed would equally answer this intention, without increasing, like the spices, the generation of air. This experiment proves the remarkable efficacy of the Columbo in preventing acidities; and the succeeding one no less clearly

clearly evinces its power of neutralizing them.

EXPERIMENT IX.

To an ounce of the infusions of chamomile flowers, of Columbo-root, and of Peruvian bark, were added twenty drops of vinegar. The infusion of Columbo entirely neutralized the acid, that of chamomile flowers in some measure covered the taste of it; but the infusion of bark was evidently sour both to the taste and smell, and it required twenty drops more of vinegar, to render the infusion of Columbo equally acidulated with that of the bark.

EXPERIMENT X.

To ascertain the action of Columbo-root on the heart and arteries, I took a
scruple

scruple of the powder in a small glass of spring water, at seven o'clock in the evening. My stomach was empty; I had been sitting at rest an hour; and my pulse then beat seventy-four strokes in a minute. I continued to sit still half an hour longer, and every fifth minute examined my pulse, but could perceive no variation, either in its regularity, fullness, or velocity. The succeeding evening I repeated the same experiment, with the precautions I had before observed, and increased the dose of Columbo to half a drachm. At the time I swallowed the powder, my pulse beat eighty strokes in a minute; in ten minutes it became fuller, and slower by three strokes, and continued to beat the same number, viz. seventy-seven for three quarters of an hour.

THIS experiment shews that the Columbo-root does not belong to the class of heating bitters: It may therefore be used with propriety and advantage in the
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ptbisis pulmonalis, and in hectic cases, to correct acrimony, and strengthen the organs of digestion. The Peruvian bark often proves oppressive to the stomach in such disorders, and sometimes excites a *diarrhæa*. But the Columbo-root occasions no disturbance, and agrees very well with a milk diet, as it abates flatulence, and is indisposed to acidity.

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ON THE
PREPARATION, CULTURE,
AND
USE
OF THE
ORCHIS ROOT.

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ON THE
PREPARATION, CULTURE, AND USE
OF THE
ORCHIS ROOT.

SALEP is a preparation of the root of Orchis, or Dogstones, of which many species are enumerated by Botanical writers. The *Orchis mascula*, Linn. *sp. pl.* is the most valued, although the roots of some of the palmated sorts, particularly of the *Orchis latifolia*, are found to answer almost equally well. This plant flourishes in various parts of Europe and Asia, and grows in our country spontaneously, and in great abundance. It is assiduously cultivated in the East, and the root of it forms a considerable part of the

diet of the inhabitants of Turkey, Persia, and Syria. A dry and not very fertile soil is best adapted to its growth. An ingenious friend of mine, in order to collect the seed, transplanted a number of the Orchises into a meadow, where he had prepared a bed well manured for their reception. The next spring few of them appeared, and not one came to maturity, their roots being black and half rotten. The same gentleman informed me, that he had never been able to raise any plant from the seed of the wild Orchis; but he ascribes his want of success to the wetness of the situation in which he resides. I have now before me a seed pod of the Orchis, the contents of which to the naked eye, seem to be seed corrupted and turned to dust, but when viewed through a microscope appear evidently to be organized, and would I doubt not with proper culture germinate, and produce a thriving crop of plants. The properest time for gathering the roots is when the
seed

seed is formed, and the stalk is ready to fall, because the new bulb, of which the salep is made, is then arrived to its full maturity, and may be distinguished from the old one, by a white bud rising from the top of it, which is the germ of the Orchis of the succeeding year.

SEVERAL methods of preparing salep have been proposed and practised. Geoffroy has delivered a very judicious process for this purpose, in the *Histoire de l'Academie Royale des Sciences* 1740; and Retzius, in the Swedish Transactions 1764, has improved Geoffroy's method. But Mr. Moulton of Rochdale has lately favoured the public with a new manner of curing the Orchis root, and as I have seen many specimens of his salep, at least equal if not superior to any brought from the Levant, I can recommend the following, which is his process, from my own knowledge of its success.

The new root is to be washed in water, and the fine brown skin which covers it is to be separated by means of a small brush, or by dipping the root in hot water, and rubbing it with a coarse linen cloth. When a sufficient number of roots have been thus cleaned, they are to be spread on a tin plate, and placed in an oven heated to the usual degree, where they are to remain six or ten minutes, in which time they will have lost their milky whiteness, and acquired a transparency like horn, without any diminution of bulk. Being arrived at this state they are to be removed, in order to dry and harden in the air, which will require several days to effect; or by using a very gentle heat, they may be finished in a few hours. (*a*)

SALEP thus prepared, may be afforded in this part of England, where labour bears

(*a*) Vid. a Letter from Mr. John Moulton to the Author, containing a new method of preparing Salep.

Phil. Transact. Vol. 59.

bears a high value, at about eight pence or ten pence per pound. — And it might be sold still cheaper, if the Orchis were to be cured, without separating from it the brown skin which covers it: A troublesome part of the process, and which does not contribute to render the root, either more palatable or salutary. Whereas the foreign salep is now sold at five or six shillings per pound.

THE culture of the Orchis therefore is an object highly deserving of encouragement, from all the lovers of agriculture. And as the root, if introduced into common use, would furnish a cheap, wholesome, and most nutritious article of diet, the growth of it would be sufficiently profitable to the farmer.

SALEP is said to contain the greatest quantity of vegetable nourishment in the smallest bulk. Hence a very judicious writer, to prevent the dreadful calamity of
of

of famine at sea, has lately proposed that the powder of it should constitute part of the provisions of every ship's company. This powder and portable soup, dissolved in boiling water, form a rich thick jelly, capable of supporting life for a considerable length of time. An ounce of each of these articles, with two quarts of boiling water, will be sufficient subsistence for a man a day (*b*); and as being a mixture of animal, and vegetable food, must prove more nourishing than double the quantity of rice cake, made by boiling rice in water; this last however sailors are often obliged solely to subsist upon for several months, especially in voyages to Guinea, when the bread and flour are exhausted, and the beef and pork, having been salted in

(*b*) Portable soup is sold at half a crown per pound; salep, if cultivated in our own country, might be afforded at ten pence per pound; the day's subsistence would therefore amount only to two pence halfpenny.

in hot countries, are become unfit for use.*

BUT as a wholesome nourishment, rice is much inferior to salep. I digested several alimentary mixtures prepared of mutton and water, beat up with bread, sea biscuit, salep, rice flour, sago powder, potato, old cheese, &c. in a heat equal to that of the human body. In forty-eight hours they had all acquired a vinous smell, and were in brisk fermentation, except the mixture with rice, which did not emit many air bubbles, and was but little changed. The third day several of the mixtures were sweet, and continued to ferment; others had lost their intestine motion, and were sour; but the one which contained the rice was become putrid. From this experiment it appears that rice as an aliment, is slow of fermentation,

* Vid. Dr. Lind's Appendix to his Essay on the Diseases of Hot Climates.

mentation, and a very weak corrector of putrefaction. It is therefore an improper diet for hospital patients; but more particularly for sailors, in long voyages, because it is incapable of preventing, and will not contribute much to check the progress of that fatal disease, the sea scurvy. (*c*) Under certain circumstances rice seems disposed of itself, without mixture, to become putrid. For by long keeping it sometimes acquires an offensive fœtor. Nor can it be considered as a very nutritive kind of food, on account of its difficult solubility in the stomach. Experience confirms the truth of this conclusion;

(*c*) CHEESE is now become a considerable article of ship provisions. When mellowed by age it ferments readily with flesh and water, but separates a rancid oil, which seems incapable of any further change, and must, as a septic, be pernicious in the scurvy. For rancidity appears to be a species of putrefaction. The same objection may be urged, with still greater propriety, against the use of cheese in hospitals; because convalescents are so liable to relapses, that the slightest error of diet may occasion them. Vid. Percival's Letter to Mr. Aikin, Thoughts on Hospitals, p. 95.

on ; for it is observed by the planters in the West-Indies, that the negroes grow thin, and are less able to work, whilst they subsist upon rice.

SALEP has the singular property of concealing the taste of salt water (*d*) ; a circumstance of the highest importance at sea, when there is a scarcity of fresh water. I dissolved a drachm and a half of common salt in a pint of the mucilage of salep, so liquid as to be potable, and the same quantity in a pint of spring water. The salep was by no means disagreeable to the taste, but the water was rendered extremely unpalatable.

THIS experiment suggested to me the trial of the Orchis root as a corrector of acidity, a property which would render it a very useful diet for children. But the solution of it, when mixed with vinegar,

(*d*) Vid. Dr. Lind's Appendix.

negar, seemed only to dilute, like an equal proportion of water, and not to cover its sharpness.

SALEP however appears by my experiments, to retard the acetous fermentation of milk, and consequently would be a good lithing for milk pottage, especially in large towns, where the cattle being fed upon four draft, must yield acescent milk.

SALEP in a certain proportion, which I have not yet been able to ascertain, would be a very useful and profitable addition to bread. I directed one ounce of the powder to be dissolved in a quart of water, and the mucilage to be mixed with a sufficient quantity of flour, salt, and yeast. The flour amounted to two pounds, the yeast to two ounces, and the salt to eighty grains. The loaf when baked was remarkably well fermented, and weighed three pounds two ounces.

Another

Another loaf, made with the same quantity of flour, &c. weighed two pounds and twelve ounces; from which it appears, that the salep, though used in so small a proportion, increased the gravity of the loaf six ounces, by absorbing and retaining more water than the flour alone was capable of. Half a pound of flour, and an ounce of salep were mixed together, and the water added according to the usual method of preparing bread. The loaf when baked weighed thirteen ounces and a half; and would probably have been heavier, if the salep had been previously dissolved in about a pint of water. But it should be remarked, that the quantity of flour used in this trial was not sufficient to conceal the peculiar taste of the salep.

THE restorative, mucilaginous, and demulcent qualities of the Orchis root render it of considerable use in various diseases. In the sea scurvy it powerfully obtunds

obtunds the acrimony of the fluids, and at the same time is easily assimilated into a mild and nutritious chyle. In diarrhœas and the dysentery it is highly serviceable, by sheathing the internal coat of the intestines, by abating irritation, and gently correcting putrefaction. In the symptomatic fever, which arises from the absorption of pus, from ulcers in the lungs, from wounds, or from amputation, salep used plentifully is an admirable demulcent, and well adapted to resist that dissolution of the *crasis* of the blood, which is so evident in these cases. And by the same mucilaginous quality, it is equally efficacious in the strangury, and dysury; especially in the latter when arising from a venereal cause, because the discharge of urine is then attended with the most exquisite pain, from the ulcerations about the neck of the bladder, and through the course of the *urethra*. I have found it also an useful

ful aliment for patients who labour under the stone or gravel. (*e*)

FROM these observations, short and imperfect as they are, I hope it will sufficiently appear that the culture of the Orchis root is an object of considerable importance

(*e*) THE ancient chemists seem to have entertained a very high opinion of the virtues of the Orchis root, of which the following quotation from the SECRETA SECRETORUM of Raymund Lully, affords a diverting proof. The work is dated 1565.

SEXTA HERBA,

Satirion.

“ SATIRION herba est pluribus nota, hujus radicis collecta ad pondus lib. 4. die 20 mensis Januarij, contunde fortiter & massam contusam pone in ollam de aurichalcum habente in cooperculo 20 foramina minuta sicut athomi, & pone intus cū prædicta messia lactis vaccini calidi sicut mulgetur de vacca ℥. 3. & mellis libram 1. vini aromatici ℥. 2. & repone per dies 20. ad solem & conferua & utere.”

“ Istius itaq; dosis ad pondus 3. 4. & hora diei decima exhibita mulieri post ipsius menstrua eadem nocte cōcipiet si vir cum ea agat.”

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50 ON THE ORCHIS ROOT.

importance to the public, and highly worthy of encouragement from all the patrons of agriculture. That taste for experiment, which characterises the present age, and which has so amazingly enlarged the boundaries of science, now animates the RATIONAL FARMER, who fears not to deviate from the beaten track, whenever improvements are suggested, or useful projects are pointed out to him. Much has been already done for the advancement of agriculture; but the earth still teems with treasures which remain to be explored. The bounties of nature are inexhaustible, and will forever employ the art, and reward the industry of man.

MISCEL-

EXPERIMENTS AND OBSERVATIONS

MISCELLANEOUS

EXPERIMENTS

AND

OBSERVATIONS.

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— *Alij hinc saltem, hac data via, felici-
cioribus freti ingenijs, rei rectius gerendæ
et melius inquirendi occasionem capiant.*

G. HARVEIJ. Op.

EXPERIMENTS AND OBSERVATIONS
ON THE WATERS OF
BUXTON AND MATLOCK,
In DERBYSHIRE.

THE water of St. Ann's well at Buxton, is found, by analysis, to contain calcareous earth, fossil alkali, and sea salt; but in very small proportions. For a gallon of the water, when evaporated, yields only twenty-three or twenty-four grains of sediment. It strikes a slight green colour with syrup of violets, suffers no change from an infusion of galls, from the fixed vegetable alkali, or from the

mineral acids; becomes milky with the volatile alkali, and with *saccharum saturni*; and lets fall a precipitate on the addition of a few drops of a solution of silver, in the nitrous acid. The specific gravity of this water is precisely equal to that of rain water, when their temperatures are the same; but it weighs four grains in a pint lighter, when first taken from the spring. The temperature of the bath is about 82 degrees of Farenheit's thermometer; that of St. Ann's well, as it is a smaller body of water, and exposed to the open air, is somewhat less. The water is transparent, sparkling, and highly grateful to the palate. (a)

IN October 1769, I passed a few days at Buxton; and during my stay there amused myself with the following experiments

(a) I AM indebted to the information of the judicious and worthy Physician, who attends at Buxton, for some of these facts.

ments on the effects of the water of St. Ann's well on my pulse.

EXPERIMENT I.

October 12th. EIGHT o'clock in the morning. The day cold and moist. My pulse beat 84 strokes in a minute. I drank at the well the third of a pint of water, and using every necessary precaution, examined my pulse at certain intervals of time. In five minutes pulse 80. In ten minutes pulse 80, fuller and harder. In twenty minutes pulse 85. In half an hour pulse 90.

EXPERIMENT II.

ELEVEN o'clock a. m. Two hours after breakfast. The air warm and serene. Pulse 90. I repeated the draught of water. In seven minutes pulse 109. In fifteen minutes pulse 103. In thirty mi-

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minutes

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minutes pulse 100. Head ach. In an hour and a half pulse 95. Head ach abated.

EXPERIMENT III.

October 13th. EIGHT o'clock in the morning. The day cold. Pulse 92. I drank the quantity of water above-mentioned. In five minutes pulse 86. In fifteen minutes pulse 86, full and hard. In twenty minutes pulse 100. In half an hour pulse 92,

FROM the first and third experiments it appears that the coldness of the morning counteracted, for a time, the effects of the Buxton water, and reduced the vibrations of my pulse from 84 to 80, and from 92 to 86. But the stimulus of the water soon became superiour to the sedative powers of the cold to which I was exposed; for within the space of half an hour my pulse rose to 90 in the first, and
to

to 100 strokes in the second trial. At eleven o'clock before noon, when the air was warm and serene, the water in a much shorter time exerted its full force, increasing the velocity of my pulse from 90 to 109 vibrations in a minute.

THESE experiments evince the heating quality of Buxton water, and suggest to us the precautions to be observed in the use of it. Small quantities only should be drunk at once, and frequently repeated; the belly should be kept soluble with lenitive electuary, or any other mild purgative; and at the beginning of the course, the patient may be directed to suffer the water to remain a few seconds in the glass, before he swallows it. For this celebrated spring abounds with a mineral spirit, or mephitic air, in which its stimulus, and indeed its efficacy resides, and which is quickly dissipated by exposure to the air.

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THE hon^{ble}. and ingenious Mr. Cavendish has shewn, by his Experiments on Rathboneplace water, *Philos. Transact.* vol. 57, that calcareous earths may be rendered soluble in water, by furnishing them with more than their natural proportion of fixed air. And it has lately been discovered that iron also may be suspended by this principle, in the same *menstruum*. (b) It appeared, therefore, highly probable to me, that a chalybeate impregnation might, with great facility, be communicated to the Buxton water, when fresh drawn from the spring; a quality which in many cases would add greatly to its medicinal efficacy. I suggested the trial to Mr. Buxton, a worthy and sensible Apothecary near the wells, who has lately, at my request, made the following experiment.

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(b) Vid. Mr. Lane's Experiments, *Phil. Trans.* vol. 59.

EXPERIMENT IV.

A QUART bottle, containing two drachms of iron filings, was filled by immersion, with the water of St. Ann's well, corked and agitated briskly under the surface of the water. It was then suffered to remain in the well till the filings had subsided, when the water was carefully decanted into a half pint glass. To this were added three drops of the tincture of galls, which immediately occasioned a deep purple colour; and the transparency was presently restored, by a few drops of the acid of vitriol; evident proofs that a solution of the iron was effected in a few minutes. The water also, without the tincture of galls, had a chalybeate taste, and left an agreeable astringency upon the palate.

By this experiment it appears that a warm chalybeate, abounding with a mineral

neral spirit, and grateful to the taste, may with very little trouble be obtained. And this method of impregnating the Buxton water with iron, must increase its tonic powers, and in many cases improve its medicinal virtues. It is a common practice to join the use of a chalybeate spring, in the neighbourhood of St. Ann's well, with that of the Buxton water. But the superiority of this artificial mineral water must be apparent, if we consider its agreeable warmth, volatility, levity, and gratefulness to the palate.

Buxton bath is very frequently employed as a temperate cold bath. For as the heat of the water is sixteen or eighteen degrees below that of the human body, a gentle shock is produced on the first immersion, the heart and arteries are made to contract more powerfully, and the whole system is braced and invigorated. But this salutary operation must be greatly diminished, often indeed more than

than counterbalanced, by the relaxing vapours which copiously exhale from the bath, to which the patients are exposed during the time of dressing and undressing. A separate room is indeed provided for the ladies; but the gentlemen have no other accommodations than what the vault affords in which the bath is contained, and are therefore liable to all the inconveniences which arise from warmth and moisture.

June 12th, 1772. THE mercury in Fahrenheit's thermometer stood in the shade at 65; but in this vault quickly rose to 78 degrees.

EXPE-

EXPERIMENTS

ON
MATLOCK WATER.

EXPERIMENT I.

A Thermometer made by Dollond, and graduated according to Farenheit's scale, was exposed for a sufficient length of time to the stream of water as it gushes out of the rock, and also immersed in the basin which receives it. The mercury rose to 66 degrees.

EXPERIMENT II.

Six drops of *sp. sal. ammon. vol.* were poured into a glass of the spring water, which

ON MATLOCK WATER. 63

which contained about the sixth of a pint; a very slight cloudiness immediately ensued; but no precipitation was afterwards observable.

EXPERIMENT III.

Six drops of a solution of salt of tartar occasioned a cloudiness just perceptible, in the same quantity of water. No precipitation ensued.

EXPERIMENT IV.

Six drops of a solution of *saccharum saturni* immediately produced a milkiness in the water, but no sensible precipitation.

EXPERIMENT V.

Six drops of a solution of silver in the nitrous acid instantly occasioned a milkiness in the water; and after standing an hour, a grey powder was observable at the bottom of the glass.

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EXPERIMENT VI.

TEN drops of the infusion of galls neither produced any change of colour in the water at the time they were added, nor was the slightest purple hue perceptible two hours afterwards.

EXPERIMENT VII.

A PIECE of paper besmeared with fresh syrup of violets was dipped into a glass full of water. No change of colour ensued.

EXPERIMENT VIII.

ANOTHER piece of paper, moistened in the same manner with the syrup, was placed over a glass of water, as soon as it was taken from the spring. The paper suffered no change of colour, although it remained an hour upon the glass.

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EXPERIMENT IX.

My pulse beat 84 strokes in a minute at the time when I drank a half pint glass of the Matlock water. In twenty minutes my pulse rose to 88. In half an hour they sunk to 82; and continued to vibrate the same number of times for an hour, which was as long as I thought it necessary to examine them.

EXPERIMENT X.

THE mercury in Fahrenheit's thermometer, when immersed in each of the baths stood at 68; in the river Derwent, which flows through the valley of Matlock, at 52. These experiments were made on the 12th of June 1772, and the weather was warm.

EXPERIMENT XI.

A four ounce phial, after being accurately counterpoised in a very nice balance, was filled to the brim with distilled

led water, which weighed three ounces, four drachms, forty-five grains and a half. The same phial, exactly balanced as before, was then filled to the brim with Matlock water of the same temperature with the distilled water, which weighed three ounces, four drachms and forty-six grains.

MATLOCK water is grateful to the palate, and of an agreeable warmth, but exhibits no marks of any mineral spirit, either by its taste, sparkling appearance in the glass, or by the chemical test employed in experiment VIII. The second and third experiments shew, that it is very slightly impregnated with *selenites*, or other earthy salts; and of this its comparative levity affords also a further proof. For it weighs twenty-six grains in a pint lighter than the Manchester pump water, (*a*) and only four grains heavier than distilled water.

(*a*) Vid. the Author's Treatise on the Pump Water of Manchester, Essays Medical and Experimental, p. 287, 2d. Edit.

ON MATLOCK WATER. 67

water. The precipitation of a grey powder by the addition of a solution of silver in *aqua fortis* to the water, renders it probable that a small portion of sea salt is contained in it. For the powder is found to consist of the particles of silver combined with the muriatic acid, which is separated from the fossil alkali by the superior affinity the nitrous acid bears to it; and thus a double elective attraction takes place in this experiment.

THIS water has been said to contain iron. But the assertion is at least rendered doubtful by the sixth experiment, which was made with the utmost accuracy; and I am inclined to think that it is entirely without foundation. The spring is justly celebrated for its efficacy in hæmoptoes; and hence it may have been too hastily concluded that it possesses some slight degree of stypticity, by means of a chalybeate impregnation.

THE ninth experiment, which my short
F 2 stay

68 ON MATLOCK WATER.

stay at Matlock would not allow me leisure to repeat, affords a presumption, that the water is not possessed of any stimulating powers. For the small increase of quickness in my pulse on drinking half a pint of it, may be ascribed more to the quantity received into the stomach, than to the heating quality of the water.

THE Bristol and Matlock waters appear to resemble each other both in their chemical and medicinal qualities. I have examined and compared them together by the tests mentioned above; and so far as such trials may be deemed conclusive, there seems to be no other than the following slight difference between them. The Bristol water becomes a little more milky on the addition of a solution of fixed alkali, and of *saccharum saturni*, than that of Matlock. The former also weighs near a grain in a pint heavier than the latter. Is it not to be lamented therefore that so little attention is paid to Matlock, even by the Physicians who reside in the
neigh-

ON MATLOCK WATER. 69

neighbourhood of it? In hectic cases, hæmoptoes, the diabetes, and other disorders in which the circulation of the blood is rapid and irregular, I should apprehend that Matlock water, on some accounts, claims the preference to that of Bristol. For as it is not sensibly impregnated with any mineral spirit, it should seem to be less disposed to quicken the pulse, and may therefore be drunk in larger quantities. But it must be acknowledged that the climate of Bristol is superior to that of Matlock; a circumstance of the highest importance to consumptive patients. Situated in a deep though delightful valley, and surrounded by very high mountains, the sun disappears at Matlock earlier in the evening, the fogs are longer in dispersing, and it may be presumed that rain falls here more frequently and copiously, than in other places. For at Chatsworth, which is encompassed also with hills, and is about ten miles distant, in 1764, 1765, 1767, and 1768, about thirty-three inches of rain at a medium fell each year.

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THE following Table exhibits a comparative view of the different temperatures of Bath, Buxton, Bristol, and Matlock waters, measured by Farenheit's thermometer.

* B A T H.

King's Bath Pump - - 112°.

Hot Bath Pump - - 114½.

Cross Bath Pump - - 110.

* B R I S T O L.

Hot Well Pump - - 76.

B U X T O N.

Bath - - - 82.

St. Ann's Well - - 81+.

M A T L O C K.

Baths - - - 68.

Spring - - - 66.

* Vid. Mr. Canton's Experiments, Phil. Transf. vol. 57. page 203.

ON

ON FIXED AIR. 71

ON THE

MEDICINAL USES

OF

FIXED AIR.

IN a course of experiments, which is yet too unfinished to lay before the public, I have had frequent opportunities of observing that fixed air may, in no inconsiderable quantity, be breathed without danger or uneasiness. And it is a confirmation of this conclusion, that at Bath, where the waters copiously exhale this mineral spirit, (*a*) the bathers inspire
F 4 it

(*a*) See Dr. Falconer's very useful and ingenious Treatise on the Bath Waters, 2d. Edit. p. 313.

it with impunity. At Buxton also, where the bath is in a close vault, the effects of such *effluvia*, if noxious, must certainly be perceived.

ENCOURAGED by these considerations, and still more by the testimony of a very judicious Physician at Stafford in favour of this powerful antiseptic remedy, I have administered fixed air in more than thirty cases of the PHTHISIS PULMONALIS, by directing my patients to inspire the steams of an effervescing mixture of chalk and vinegar, through the spout of a coffee-pot. The hectic fever has in several instances been considerably abated, and the matter expectorated has become less offensive and better digested. I have not yet however been so fortunate in any one case, as to effect a cure; although the use of mephitic air has been accompanied with proper internal medicines. But Dr. Withering, the gentleman referred to above, informs me, that he has been more successful. One phthifical patient under
his

his care, has by a similar course entirely recovered; another was rendered much better; and a third, whose case was truly deplorable, seemed to be kept alive by it more than two months. It may be proper to observe, that fixed air can only be employed, with any prospect of success, in the latter stages of the *phthisis pulmonalis*, when a purulent expectoration takes place. After the rupture and discharge of a *VOMICA* also, such a remedy promises to be a powerful palliative. Antiseptic fumigations and vapours have been long employed, and much extolled in cases of this kind. I made the following experiment to determine whether their efficacy, in any degree, depends on the separation of fixed air, from their substance.

ONE end of a bent tube was fixed in a phial full of lime water; the other end in a bottle of the tincture of myrrh. The junctures were carefully luted, and the phial containing the tincture of myrrh was

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was placed in water, heated almost to the boiling point, by the lamp of a tea-kettle. A number of air bubbles were separated, but probably not of the mephitic kind, for no precipitation ensued in the lime water. This experiment was repeated with the *tinct. tolutana*, *Ph. Ed.* and with *sp. vinos. camph.* and the result was entirely the same. The medicinal action therefore of the vapours raised from such tinctures, cannot be ascribed to the extrication of fixed air; of which it is probable bodies are deprived by *chemical solution* as well as by *mixture*.

IF mephitic air be thus capable of correcting purulent matter in the lungs, we may reasonably infer it will be equally useful when applied externally to foul ULCERS. And experience confirms the conclusion. Even the fanies of a CANCER, when the carrot poultice failed, has been sweetened by it, the pain mitigated, and a better digestion produced. The cases I refer to are now in the Manchester Infirmary,

Infirmary, under the direction of my friend Mr. White, whose skill as a surgeon, and abilities as a writer are well known to the public.

Two months have elapsed since these observations were written, (*a*) and the same remedy, during that period, has been assiduously applied, but without any further success. The progress of the cancers seems to be checked by the fixed air; but it is to be feared, that a cure will not be effected. A palliative remedy, however, in a disease so desperate and loathsome, may be considered as a very valuable acquisition. Perhaps NITROUS AIR might be still more efficacious. This species of factitious air is obtained from all the metals, except zinc, by means of the nitrous acid; and Dr. Priestley informs me, that as a sweetener and antiseptic it far surpasses fixed air. He put two mice into a quantity of it, one just killed, the other offensively putrid. After twenty-five days they were both perfectly sweet.

IN

(*a*) May, 1772.

IN the ULCEROUS SORE THROAT much advantage has been experienced from the vapours of effervescing mixtures, drawn into the *fauces*. (*a*) But this remedy should not supersede the use of other antiseptic applications. (*b*)

IN MALIGNANT FEVERS, wines abounding with fixed air may be administered, to check the septic ferment, and sweeten the putrid *colluvies* in the *primæ viæ*. If the laxative quality of such liquors be thought an objection to the use of them, wines of a greater age may be given, impregnated with mephitic air, by a simple but ingenious contrivance of my learned friend Dr. Priestley, which will very soon be laid before the public. (*c*)
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(*a*) Vid. Mr. White's useful Treatise on the Management of Pregnant and Lying-in Women, p. 279.

(*b*) See the Author's Observations on the efficacy of external applications in the Ulcerous Sore Throat, Essays Med. and Experimental, 2d. Edit. p. 377.

(*c*) DIRECTIONS for impregnating water with fixed air, in order to communicate to it the peculiar spirit and virtues of Pyrmont water, and other mineral waters of a similar nature; by Joseph Priestley, L. L. D. F. R. S.

The patients common drink might also be medicated in the same way. A putrid *diarrhœa* frequently occurs in the latter stage of such disorders; and it is a most alarming and dangerous symptom. If the discharge be stopped by astringents, a putrid *fomes* is retained in the body, which aggravates the delirium, and increases the fever. On the contrary, if it be suffered to take its course, the strength of the patient must soon be exhausted, and death unavoidably ensue. The injection of mephitic air into the intestines, under these circumstances, bids fair to be highly serviceable. And a case of this deplorable kind has lately been communicated to me, in which the vapour of chalk and oil of vitriol, conveyed into the body, by the machine employed for tobacco clysters, quickly restrained the *diarrhœa*, corrected the heat and fœtor of the stools, and in two days removed every symptom of danger. A similar instance of the salutary effects of mephitic air, thus administered, has occurred also in
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my own practice; the history of which I shall probably lay before the public. May we not presume that the same remedy would be equally useful in the DYSENTERY? The experiment is at least worthy of trial.

THE use of wort, from its saccharine quality, and disposition to ferment, has lately been proposed as a remedy for the SEA SCURVY. Water, or other liquors already abounding with fixed air in a separate state, should seem to be better adapted to this purpose, as they will more quickly correct the putrid disposition of the fluids, and at the same time, by their gentle stimulus (*a*), increase the powers of digestion, and give new strength to the whole system. Dr. Priestley, whose inventive genius suggested both the idea, and the means of executing it, has, under the sanction of the College of Physicians, proposed

(*a*) THE vegetables, which are most efficacious in the cure of the scurvy, possess some degree of a stimulating power.

proposed the scheme to the Lords of the Admiralty, who have ordered trial to be made of it, on board some of his Majesty's ships of war. Might it not, however, give additional efficacy to this remedy, if instead of simple water, the infusion of malt were to be employed?

I AM persuaded such a medicinal drink might be prescribed also with great advantage in scrophulous complaints, and other disorders in which a general acrimony prevails, and the *crasis* of the blood is destroyed. Under such circumstances I have seen *vibices*, which spread over the body, disappear in a few days, from the use of wort.

A GENTLEMAN, who is subject to a scorbutic eruption in his face, for which he has used a variety of remedies with no very beneficial effect, has lately applied the fumes of chalk and oil of vitriol to the parts affected. The operation occasions great itching and prickling in the skin,

skin, and some degree of drowsiness, but evidently abates the serous discharge, and diminishes the eruption. This patient has several symptoms which indicate a genuine scorbutic *diathesis*; and it is probable that fixed air taken internally would be a useful medicine in his case.

THE saline draughts of Riverius are supposed to owe their antiemetic effects to the air, which is separated from the salt of wormwood, during the act of effervescence. And the tonic powers of many mineral waters seem to depend on the same principle. But I shall exceed my design by enlarging further on this subject. What has been advanced, it is hoped, will suffice to excite the attention of Physicians to a remedy, which is capable of being applied to so many important medicinal purposes.

ON THE ANTISEPTIC AND SWEETEN-
ING POWERS, AND ON THE VARIE-
TIES OF FACTITIOUS AIR.

THOUGH the fact has lately been controverted by an ingenious writer, I am fully convinced with Dr. Macbride, from the evidence of repeated experiments, that fixed air has the property both of retarding and of correcting putrefaction. It may afford matter of amusement, to consider in what manner these effects are produced.

THAT fixed air may restrain, and even prevent putrefaction, without possessing any inherent antiseptic quality, is not difficult to conceive. For by furrounding the putrescent substance with that kind of air,

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which it yields by putrefaction, and which requires some vehicle to discharge or carry it off, the separation of it is prevented, and the body thus retained in its original state. This may be illustrated by a wet sponge or cloth, which will never become dry in an atmosphere saturated with moisture. Or still more appositely by putting a mixture of sulphur and iron filings in a confined place, or in air in which candles have burned out. Under these circumstances, no heat, effervescence, or fume can be generated; whereas the same mixture in fresh air presently grows hot, smokes copiously, and smells very offensively. (a) The same observation will account for the curious fact mentioned by Dr. Alexander, that the *effluvia* of putrid substances retard putrefaction in the bodies exposed to them. Perhaps, however, the generation of a volatile alkali may have some share in producing this effect.

BUT

(a) See Doctor Priestley's most ingenious papers on factitious air, which will probably be published in the 62d. vol. of the Philosophical Transactions.

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BUT supposing the foregoing hypothesis to be well founded, which I advance only as conjecture, how are we to explain the sweetening powers of fixed air? An eminent philosopher seems to hint that fixed air may act as a *menstruum* for the putrid *effluvium*, and thus imbibe or discharge it from the septic body. The same idea suggested itself to Mr. Henry, in consequence of the following experiment, to which I was a witness. A piece of putrid flesh was suspended twelve hours, in a three pint bottle closely corked, and filled with fixed air, which had been separated from chalk by the vitriolic acid. The beef was considerably sweetened, but the air in the bottle was rendered intolerably offensive. Now it affords a natural solution of this fact, if we admit that fixed air, by the laws of chemical affinity, abstracts from the septic body, and holds suspended or dissolved the putrid particles which it emits. And such an affinity seems probable, from their ready combination,

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ination, as well as from their disposition to fly off together from putrefying substances. But how is the putrefactive process checked, and the fresh generation of *effluvia* restrained under such circumstances? A piece of the same flesh, which was employed in the foregoing experiment, was left all night in the external air, by the circulation of which the *effluvia* could not fail to be carried off as they were formed; yet the offensive odour of the flesh was not diminished. Has not the reason of this difference, between the exposure of a putrid substance to common air, and to mephitic air, been before assigned, when it was suggested that the latter may perhaps restrain the flight of that principle in bodies, the separation of which constitutes an essential part of the process of putrefaction? Animal flesh will neither become putrid in *vacuo*, nor when closely confined from the access of common air. In both cases a vehicle is wanting for the escape of the mephitic air.

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air. In like manner red hot wood ceases to burn, in inflammable air, because such air is already saturated with phlogiston.

I HAVE advanced the preceding conjectures, concerning the manner in which fixed air may retard and correct putrefaction, not as affording me full conviction, or to indulge a fanciful hypothesis, but to promote the further investigation of a subject so curious and interesting.

EXPERIMENT I.

IT is a fact lately ascertained by a very accurate Philosopher, that putrefaction generates air similar to that which animals have breathed. But this and the succeeding experiment shews that there is some little diversity in their properties and effects. Air was blown forcibly from the lungs, for a sufficient length of time, into a phial containing distilled water and iron filings. The water was then filter-

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ed, and a few drops of the infusion of galls were added to it. A dark red colour, inclining to purple, was instantly produced.

* EXPERIMENT II.

EIGHT ounces of ox gall were poured into a bottle, which had a tube communicating with another phial, containing half an ounce of iron filings, and four ounces of distilled water. After standing two days, part of the water was filtered, and suffered no change of colour from the addition of an astringent tincture. But the next day, when the fermentation in the gall was more evident, another filtered portion of the water struck with the same tincture a deep rosy red. On the fifth and sixth days, when the gall became intolerably putrid, though the vapour still corroded the iron filings, it seemed to have
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* Communicated by Dr. Falconer of Bath.

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lost the power of dissolving them. For the astringent tincture no longer produced any change of colour in the water, and the iron was evidently precipitated.

* EXPERIMENT III.

SOLUTIONS of iron in water, obtained by different kinds of fixed air, vary in the colours which they strike with an infusion of galls. When the vitriolic acid and fossil alkali are employed, a black tinge is produced; when magnesia, or calcareous earths and the same acid are used, a purple hue is struck; and when the air is supplied by fermentation, the artificial chalybeate is changed by galls into a rosy red.

EXPERIMENT IV.

AIR discharged from chalk by the vitriolic acid readily and perfectly combines

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with

* By the same.

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with water ; but when separated by the nitrous acid, the union is more difficult to be effected, and much less complete. And the artificial mineral water, made by the latter, is more pungent and sparkling than by the former acid.

EXPERIMENT V.

FACTITIOUS AIR, separated from steel filings by the vitriolic acid, neither occasioned any precipitation in lime water, nor rendered the caustic fixed alkali mild. Whereas the air set free from chalk and magnesia, by the same acid, instantly produced a milkiness in lime water, and restored to the caustic alkali the power of effervescence.

EXPERIMENT VI.

A PIECE of putrid mutton, which had been employed as a standard in some other experiments, was divided into two equal

ON FACTITIOUS AIR. 89

equal parts: One of these was suspended by a thread in a phial, containing an effervescent mixture of chalk and dilute spirit of vitriol; the other in a similar phial, with a mixture of iron filings and the same acid. The mouths of the phials were slightly stopped with folded paper; and a brisk fermentation took place in each of them. After being exposed sixteen hours to the air detached from these substances, the bits of mutton were taken out, and examined. They were both considerably firmer in their texture; and the one which had been suspended over the effervescent mixture of chalk and oil of vitriol was entirely sweetened; but the putrid fetor of the other was not in the least degree corrected.

EXPERIMENT VII.

A PIECE of putrid flesh was suspended about half an hour over a mixture of iron filings and nitrous acid, and was perfectly

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ly sweetened. It had acquired a pungent and slightly acid smell, but remained firm and free from fœtor when this odour was washed off. The water, in which the flesh was washed, did not effervesce with *lixivium tartari*; nor did the vapour arising from the spirit of nitre and iron filings produce any change of colour in a paper covered with syrup of violets; presumptive proofs that the sweetness of the flesh was not restored by any acid fumes.

THE fixed air of metals seems, by some of these experiments, to be of a kind different from that which is contained in alkalis and calcareous earths. And consequently the action of these substances as *fluxes*, cannot be explained on the principle of their restoring the air which had been lost by calcination. Indeed there are other proofs that the resuscitation of calces does not depend on this cause. I have been assured by an able Chemist that he has repeatedly restored *minium* to its

its metalline state, by the caustic alkali, assisted by a proper degree of heat; and that several of the metals may be revived by the force of fire alone. It is true that a mild calcareous earth employed as a flux, is always rendered caustic by the operation. But this may be owing to the action of the fire, and not to the loss of its air by elective attraction. Perhaps the operation of alkalis and calcareous earths as fluxes may depend on their absorbing the matter which seems to be added to metallic substances by the process of calcination, and which furnishes such an amazing increase of weight (*a*)? Inflammable bodies may produce the same effect, by volatilizing and carrying it off.

(*a*) ANTIMONY, when calcined, gains one eleventh part of its original weight; zinc one tenth; tin one sixth; and lead, when converted into minium, one fourth.

* ON THE
 NOXIOUS VAPOURS
 OF
 CHARCOAL.

— *Sævamque exhala opacat mephitin.*

Virgil. *Æneid.* lib. 7. 34.

THE accurate and ingenious Doctor Hales, has proved by a great variety of experiments, that air enters in a very considerable proportion into the composition of all bodies. That air thus combined, is in a fixed state, and contributes to form the union and firm connection of the constituent parts of bodies; and

* Communicated by Dr. Dobson of Liverpool.

and that on their destruction or decomposition, this fixed air is again restored to its state of elasticity.

FIXED AIR, whether procured by fire, fermentation, or chemical resolution, has been supposed to be a body *sui generis*; and to possess properties, by which it is always distinctly characterised. It is more conformable however to the simplicity which is constantly observed in the operations of nature, to conclude, that as it is common atmospheric air which enters into the composition of bodies, it is likewise the same air which is again detached, on their decomposition or destruction; that its varieties depend on adventitious matter; and that it has different degrees of mixture and composition, according as it is obtained from different substances, or by a different process.

THAT by degrees however, it is decomposed; returns to its original simplicity;

plicity ; is restored to the common magazine from which it was taken ; and that the atmosphere is thus constantly gaining by one process, what it loses by another.

FACTITIOUS or FIXED AIR is the general term, by which this subject is distinguished ; and when it produces any noxious effects, either in consequence of the process by which it is procured, or the manner in which it is applied, it may then be properly called MEPHITIC AIR.

MUCH has been done by some very ingenious modern writers, to illustrate this subject ; and much still remains to be done, to compleat the chemical and medical history of fixed air. The present commentary, chiefly respects the factitious air of charcoal ; or the mephitic vapours which arise from this substance, in the state of ignition. And the following history points out both the noxious qualities of these vapours, and their mode of action on the animal œconomy.

October

October 5th, 1769. A servant to a gentleman's family in Liverpool, shut himself up in a small room to clean plate. In this room there was a chafing-dish of burning charcoal, and the door and window were closed. He soon felt himself *very ill*, as he expressed it; was chilly, sickish, and had shooting pains in the head. He continued to be affected in this manner for upwards of an hour and a half, during which time he had been twice called out, but returned again to the same situation in a few minutes. The chills, sickness, and pain in the head became more severe, and were increased by fits; he retched, but could not vomit. These were the only sensations he could recollect; and on my asking him, whether he did not feel an oppression at his breast, or a sense of suffocation, he answered in the negative.

He remembered that he heard the clock strike eleven, which was an hour
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and a half from his first going into the room; and still finding himself very ill, but having no suspicion of the cause, he leaned forwards, rested his head upon his hands, and from that time had no further knowledge of what passed.

ABOUT half an hour after this, some of the family going near the door, were alarmed by his groans. The door was forced open, and he was found extended on the ground; his eyes fixed and staring; his hands clenched; his arms, legs, and whole body rigid; and his countenance, which was naturally pale, had now a death-like appearance.

HE was immediately carried into the open air; but it was with difficulty that his limbs were so bent that he could be seated in a chair. He continued to groan, and on the application of hartshorn drops to his nose, exerted a kind of motion, as if offended. Cold water thrown upon his face,

face, had a more powerful effect to rouse him. After ten minutes, he came to himself; and in about twenty minutes, he was able to walk.

AT this time I first saw him; he complained of pain in his head, coldness and sickness; was hot to the touch; his pulse, small and frequent, 120 in a minute. While I was examining him, I observed his voice faltered; his eyes became fixed; he staggered forwards, and would have fallen, had he not been supported. He was placed in a chair, and remained in a state of insensibility near a minute; there was no rigidity, the colour of the countenance did not change, but the pulse was extremely small, frequent, and irregular. On coming to himself, he complained much of pain in his head, was sick, retched, trembled, and was cold and hot by fits; a considerable degree of fever remained for two days, and then gradually left him.

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WE have here a fair opportunity of observing the effects of these noxious vapours. The patient was near two hours struggling with the poison; and the whole progress of the symptoms clearly points out, an immediate affection of the brain and nervous system, and of the lungs.

IT is the common apprehension, that those who are killed by the effluvia of burning charcoal, are *suffocated*; and this apprehension is supported by the authorities of some very distinguished practical writers.

MORGAGNI, in his excellent work *de Sedibus et Causis Morborum*, asserts, that those who die from the *steams of charcoal*, the steams of the fermenting grape, in the Grotto di Cani, and in the cavern of Pyrmont, are *suffocated*. (a)

HOFFMAN, in his Dissertation *de fumo carbonum*

(a) Epist. 19. §. 40.

carbonum noxio, says, that these vapours being received into the breast, distend the lungs, prevent the admission of air, and thus *suffocate*. (b) The mode of operation is expressed in very strong terms. *Eadem enim horum operandi ratio est, ac si asperam arteriam filo constringas; nam utroque horum aeris sufficiens introitus impeditur.* (c)

DOCTOR HALES concludes, that the steams of the Grotto di Cani, and several other noxious vapours, destroy the elasticity of the air, occasion the vesicles of the lungs to collapse, and thus *suffocate*, and cause sudden death. (d)

SUCH are the respectable authorities which give weight to the common opinion, that those who are killed by these noxious effluvia, are suffocated. The following experiments, histories, and ob-

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servations,

(b) Hoffman, tom. 4. p. 697. 22. (c) Ib.

(d) Hale's Statics. p. 260, 261.

servations tend, however, to establish a different doctrine.

WE learn from the experiments of the celebrated Greenwood, that the air of a well, in which the men who went down perished, and in which a lighted torch was instantly extinguished, did not differ from common air, either in gravity, humidity, or elasticity. (*e*)

THE same is found to be true of the Grotto di Cani. In this, the height of the mercury in the barometer was not altered by the deadly vapours. (*f*) And we have the same proof of the state of the air in the cavern of Pyrmont. (*g*) It appears likewise from the experiments of the learned Leonardo Capuano, that those animals which do *not breathe*, are destroyed in the Grotto di Cani, though slowly and with more difficulty.*

DOCTOR

(*e*) Saggio delle Tranfar. tom. 5. p. 2.

(*f*) Mead. de Venenis, tent. 6.

(*g*) Commerc. litter. A. 1737. Heb. 8.

* Delle Mofette, Lez. 1.

DOCTOR HALES indeed proves, that the fumes of burning sulphur, and the exhalations from the lungs of animals, bring into a fixed state part of the air through which they are dispersed, and consequently diminish its elasticity. That this circumstance however is not the cause of death, is hence evident; in high winds and storms, and on ascending very high mountains, a greater diminution of elasticity takes place, without such fatal effects. †

ALL these noxious vapours, whether arising from burning charcoal, the fermenting grape, the Grotti di Cani, or the cavern of Pyrmont, operate nearly in the same manner. When accumulated and confined, their effects are often instantaneous; they immediately destroy the action of the brain and nerves, and in a moment arrest the vital motions. When

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† Veratti Com. Acad. Bonon. tom. ii. Pt. II. p. 271. 276,
And Element. Physiolog. Haller. vol. 3. p. 208.

more diffused, their effects are slower, but still evidently mark out a direct affection of the nervous system.

THOSE who are exposed to the vapours of the fermenting grape, are as instantly destroyed, as they would be by the strongest electrical shock. A state of insensibility is the immediate effect upon those animals which are thrust into the Grotti di Cani, or the cavern of Pyrmont; the animal is deprived of motion, lies as if dead, and if not quickly returned into the fresh air, is irrecoverable. And if we attend to the histories of those who have suffered from the vapours of burning charcoal, we shall in like manner find, that the brain and moving powers, are the parts primarily affected.

A cook who had been accustomed to make use of lighted charcoal more than his business required, and to stand with his head over these fires, complained
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for a year of very acute pain in the head; and after this, was seized with a paralytic affection of the lower limbs, and a slow fever. (*b*)

A PERSON was left reading in bed with a pan of charcoal in a corner of the room. On being visited early the next morning, he was found with his eyes shut, his book open and laid on one side, his candle extinguished, and to appearance like one in a deep sleep. Stimulants and cupping glasses gave no relief; but he was soon recovered by the free access of fresh air. (*i*)

FOUR prisoners, in order to make their escape, attempted to destroy the iron work of their windows, by the means of burning charcoal. As soon as they commenced their operations, the fumes of the charcoal being confined by the closeness of the prison, one of them was struck dead;

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another

(*b*) Morgagni. Epist. 64. §. 15. (*i*) Chesneau, 696.

another was found pale, speechless, and without motion; afterwards he spoke incoherently, was seized with a fever and died. The other two were with great difficulty recovered. (*k*)

Two boys went to warm themselves in a stove heated with charcoal. In the morning they were found destitute of sense and motion, with countenances as composed as in a placid sleep. There were some remains of pulse, but they died in a short time. (*l*)

A FISHERMAN deposited a large quantity of charcoal in a deep cellar. Some time afterwards, his son, a healthy strong man, went down into the cellar with a pan of burning charcoal and a light in his hand. He had scarcely descended to the bottom, when his candle went out. He returned, lighted his candle, and again descended. Soon

(*k*) Donatus Epist. 694. (*l*) Ib. 695.

Soon after he called aloud for assistance. His mother, brother, and a servant hastened to give him relief, but none of them returned. Two others of the village shared the same fate. It was then determined to throw large quantities of water into the cellar; and after two or three days, they had access to the dead bodies.*

CÆLIUS AURELIANUS says, that those who are injured by the fumes of charcoal, become cataleptic. (*m*) And Hoffman himself, in another part of his works, enumerates a train of symptoms which in no respect correspond with his idea of suffocation. Those who suffer from the fumes of burning charcoal, says he, have severe pains in the head, great debility, faintness, stupor and lethargy. (*n*)

It appears from the above histories and observations, that these vapours exert
their

* Histoire de l' Academié de science, Ann. 1710.

(*m*) De morbis acutis, lib. ii. c. x.

(*n*) Tom. 1. p. 229. § 5.

their noxious effects on the brain and nerves. Sometimes they occasion sudden death; at other times, the various symptoms of a debilitated nervous system, according as the poison is more or less concentrated. The olfactory nerves are first and principally affected, and the brain and nervous system by sympathy or consent of parts. It is well known, that there is a strong and ready consent between the olfactory nerves and many other parts of the nervous system. The effluvia of flowers and perfumes, in delicate or irritable habits, produce a train of symptoms, which though transient, are analogous to those which are produced by the vapours of charcoal; viz. vertigo, sickness, faintness, and sometimes a total insensibility. The female malefactor, whom Doctor Mead inoculated by putting into the nostrils dossils of cotton impregnated with variolous matter, was immediately on the introduction, afflicted with a most excruciating head ach, and had a constant fever till after the eruption.

THE

THE vapours of burning charcoal, and other poisonous effluvia, frequently produce their prejudicial and even fatal effects, without being either offensive to the smell, or oppressive to the lungs. It is a matter of importance therefore, that the common opinion should be more agreeable to truth; for where suffocation is supposed to be the effect, there will be little apprehension of danger, so long as the breast keeps free from pain or oppression.

IT may be well to remember, that the poison itself is distinct from that gross matter which is offensive to the smell; and that this is frequently in its most active state, when undistinguished by the sense. Were the following cautions generally attended to, they might in some instances be the happy means of preserving life. Never to be confined with burning charcoal in a small room, or where there is not a free draught of air
by

by a chimney or some other way. Never to venture into any place in which air has been long pent up, or which from other circumstances ought to be suspected; unless such suspected place be either previously well ventilated, or put to the test of the lighted candle. For it is a singular and well known fact, that the life of flame, is in some circumstances sooner affected and more expeditiously extinguished by noxious vapours, than animal life. A proof of which I remember to have received from a very intelligent Clergyman, who was present at a musical entertainment in the theatre at Oxford. The theatre was crowded; and during the entertainment, the candles were observed to burn dim, and some of them went out. The audience complained only of faintness and languor; but had the animal effluvia been still further accumulated or longer confined, they would have been extinguished as well as the candles.

THE

THE most obvious, effectual, and expeditious means of relief to those who have unhappily suffered from this cause, are such as will dislodge and wash away the poison, restore the energy of the brain and nerves, and renew the vital motions. Let the patient therefore be immediately carried into the open air, and let the air be fanned backwards and forwards to assist its action; let cold water be thrown on the face, and let the face, mouth and nostrils be repeatedly washed; and as soon as practicable get the patient to drink some cold water. But if the case is too far gone to be thus relieved, let a healthy person breathe into the mouth of the patient; and gently force air into the mouth, throat and nostrils. Frictions, cupping, bleeding, and blisters are likewise indicated. And if after the instant danger is removed, a fever be excited, the method of cure must be adapted to the nature and prevailing symptoms of the fever.

ON THE

A T R A B I L I S.

THE ancients, as appears from Galen, supposed the *atrabilis* to be derived either from the dregs of the blood, or from yellow bile torrefied and highly concocted. A celebrated modern anatomist is of opinion that it is blood, which having lodged some time in the intestinal canal, has acquired a blackness and putridity. But is it not more probable that in general it is no other than gall, become acrid by stagnation in the *vesica fellea*, and rendered viscid by the absorption of its fluid parts? When discharged into the *duodenum* in this state, it occasions universal disturb-

disturbance and disorder, till evacuated either by vomiting or purging. I have lately had under my care a young gentleman, labouring under a *marasmus*, produced by excessive intemperance. During the course of his disorder, which at last proved fatal, he several times voided both by stool and vomiting, a considerable quantity of black, tenacious, and most offensive bile. The symptoms preceding the discharge, and which ceased soon afterwards, were a quick pulse, head ach, delirium, hiccup, intense thirst, inward heat, and an uncommon foetor in his breath. A lady aged thirty, unhappily addicted to habits which have a peculiarly pernicious effect upon the liver, after a constipation of the belly during six days, was seized with a violent and incessant vomiting of black and viscid bile. The *infusum senæ limoniatum*, warmed with the tincture of Columbo soon checked her reachings, and operating by stool prevented the return of her vomiting. The matter

ter discharged in both these cases bore not the least resemblance to grumous blood. I have several times observed the febrile symptoms in children, which are ascribed to dentition, relieved by these pitchy stools. And I recollect three cases of the *acute asthma*, as Dr. Millar terms it, the paroxysms of which seemed to be critically terminated by a similar evacuation. Whether in these instances the black bile was the cause or the effect of the disease, cannot with certainty be determined; but the former appears to be the more probable opinion.

ON

ON THE
SEPTIC QUALITY

O F
SEA SALT,
&c. &c.

SIR JOHN PRINGLE observes that one drachm of sea salt preserves two drachms of fresh beef, in two ounces of water, above thirty hours uncorrupted, in a heat equal to that of the human body, that is twenty hours longer than water alone; but that half a drachm of salt does not preserve it above two hours longer than pure water; that twenty-five grains have little or no antiseptic virtue; and that ten

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grains both heighten and hasten the corruption of the flesh. (a) The result of this experiment is so curious and unexpected, that I wished to ascertain the cause of it.

EXPERIMENT I.

May 15th, 1772. EQUAL parts, viz. two drachms of the lean of mutton, chopped very small, were separately put into five wide mouthed phials, and to each were added two ounces of pump water. Ten grains of sea salt were dissolved in the first; the same quantity of brown bay salt in the second; of *sal catharticus amarus* in the third; and of true glauber's salt in the fourth. The fifth contained only flesh and water, and was intended for a standard. The bottles were slightly corked, and after a gentle agitation placed in a window, exposed to the western sun. The mercury in Fahrenheit's thermometer then stood in the shade at 65 degrees. IN

(a) Pringle's Diseases of the Army, Appendix, p. 38.

IN twenty-nine hours the mixture which contained the *sal catharticus amarus* had acquired somewhat of a putrid taint.

IN forty hours the standard was slightly offensive. The mixture with sea salt was putrid, and that with the cathartic salt was yet more putrid.

IN fifty hours the standard and the two mixtures above-mentioned were equally putrid. The two others were sweet.

IN sixty-two hours the standard was become much more offensively putrid than the two mixtures with sea salt, and cathartic salt, in which the putrefactive process appeared not to have advanced any further. The flesh with the brown bay salt was now slightly tainted; but that with the true glauher's salt was still sweet.

IN seventy-five hours the mixture with brown bay salt was become putrid, and
I 2 that

that with the true glauher's salt a little offensive. And in twelve hours longer the latter mixture was also putrid.

FROM this experiment it appears that common salt, in the quantity of ten grains promotes putrefaction, and that the *sal catharticus amarus* in the same proportion is yet more septic; but that bay salt in this quantity resists putrefaction, and that true glauher's salt exceeds in this respect even bay salt. The septic and antiseptic qualities of these salts, when used in so minute a quantity, are therefore evidently dependent on, and proportioned to their degrees of purity. Alimentary salt, it is well known, contains in its crystals an earthy salt, similar to that of Epsom; which is a powerful ferment, almost equally capable in a small as in a large quantity, of exciting the putrefactive process in substances disposed to it. Whereas the pure neutral itself, which consists of the muriatic acid and the fossil alkali, can only exert its antiseptic powers when used in a proportion
adequate

adequate to the action of the bitter salt with which it is combined, and superiour to the putrid tendency of the animal flesh, which it is employed to preserve. (b)

EXPERIMENT II.

May 21. SIX days from the commencement of the experiment, the pieces of flesh in the solutions of common salt, and of *sal catharticus amarus*, were not more offensive than on the third day; and the mixtures emitted no air bubbles. But the standard at this time was intolerably putrid, very frothy, and the bits of mutton had risen to the surface of the water.

THIS experiment shews that both sea salt and the bitter purging salt, though they quicken putrefaction, prevent the progress of it beyond a certain degree. A quality which

(b) SIR John Pringle informs me, he has long suspected, but never ascertained the fact by experiment, that the septic quality of sea salt is owing to some heterogeneous substance joined to it.

which must increase the usefulness of the former, as a seasoning to our food.

A LATE eminent and learned writer has related the history of a violent scurvy, produced by drinking sea water. A young lady, aged 16, tall, thin, and of a delicate constitution, though in tolerable good health, was advised to use sea water on account of a strumous swelling and inflammation of her upper lip. She drank a pint of it every morning for ten days successively; which did not pass off freely by the usual evacuations. At the end of this period she was suddenly seized with a profuse discharge of the *catamenia*, was perpetually spitting blood from the gums, and had innumerable petechial spots on different parts of her body. Her pulse was quick, though full; her face pale and somewhat bloated; and her flesh soft and tender. She was often faint, but soon recovered her spirits. The flux from the *uterus* at length abated; but that from the gums increased to such a degree, that
her

her Apothecary took a little blood from her arm. From the orifice blood continually ouzed for several days. At last an hæmorrhage from the nose came on, attended with frequent faintings, in which she at length expired, choaked as it were with her own blood. Before she died, her right arm was mortified from the elbow to the wrist. And it is further to be remarked, that though blood let from her some weeks before she began the use of sea water, was sufficiently dense; yet that drawn in her last sickness was mere putrid, and dissolved gore. (*a*)

DOCTOR HUXHAM explains the dissolvent action of sea water in this instance, by supposing an accumulation of the marine salt in the mass of blood, which running into *moleculæ*, too large to pass the minutest vessels, occasioned stagnations; and by irritating the capillaries, produced ruptures of them, extravasations, blotches, and livid spots. But do not the preceding ex-

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periments

(*a*) Vid. Philos. Transact. Vol. 53, p. 6.

periments suggest a better solution of the fact? Sea water abounds with the cathartic salt, which constitutes the bitterness of it; and this has been proved to be a powerful septic.

A PHYSICIAN who often takes magnesia, to correct an acidity in his stomach, arising from indigestion, invariably observes that the discharges which it produces are peculiarly putrid and offensive. Hence it is probable that this earth combined with an acid of the vegetable as well as of the mineral class, promotes putrefaction. Should we not therefore employ the *sal catharticus amarus* and *magnesia alba* with caution, in diseases of a putrid tendency?

I CANNOT omit this opportunity of recommending the calcination of magnesia, as a great improvement of that medicine. The loss of its fixed air, which by this process appears to constitute seven twelfths
of

of its weight, obviates the flatulence which it produces in the *primæ viæ*, without diminishing its purgative or absorbent qualities. Care however should be taken that the magnesia be free from any calcareous earth, otherwise the action of the fire will render this mild powder offensively caustic to the stomach, as I have more than once experienced. Magnesia may be calcined with very little trouble, in a common crucible placed in a glowing fire, and kept red hot during the space of two hours. This improvement was suggested to me by a Physician in London, distinguished for his knowledge of chemistry.

C O F F E E.

THOUGH coffee has been in general use for more than a century past, has been analysed by fire, and variously investigated by writers of learning and reputation; yet neither chemistry nor experience have hitherto ascertained its true nature, or medicinal qualities. Of this the contradictory testimonies which have been delivered concerning it, afford a painful evidence. For it is surely to be lamented that an article of diet, active in its powers, and universally employed, should

should be so little understood. The following experiments may perhaps lead to farther enquiries on this useful subject.

EXPERIMENT I.

THIRTY berries of roasted, and the same number of unroasted coffee were each digested, forty-eight hours, in two ounces of rectified spirit of wine. The former tincture was strongly impregnated with the peculiar taste and odour of the coffee; the latter had acquired little or no sensible flavour.

EXPERIMENT II.

TEN drops of a solution of green vitriol, were added to a tea spoonful of each of the above-mentioned tinctures, diluted with an ounce of water. Both assumed a purple colour; but the change was greatest in the tincture prepared with unroasted coffee.

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A similar difference was observable in the infusions of roasted and unroasted coffee prepared with water, allowance being made for the dark hue communicated to the *menstruum* by the roasted coffee.

THESE facts evince the action of fire in diminishing astringency; and furnish an additional proof of the impropriety of employing heat in preparations of the bark, and other vegetables of a like quality. (a)

EXPERIMENT III.

Two drachms of roasted mutton chopped very small, were digested in an ounce of pump water, and in the same quantity of a strong infusion of roasted coffee. The phials which contained the mixtures, were placed at a moderate distance

(a) Vid. the Author's Essays Medical and Experimental, 2d. edit.

tance from the fire, so as to be kept nearly blood warm. In thirty hours the mutton and water became putrid; but the infusion of coffee continued sweet twelve hours longer.

EXPERIMENT IV.

To ascertain the action of coffee on the digestion of food in the stomach, I prepared three alimentary mixtures, consisting of equal parts, viz. two drachms of roasted mutton, of the crumb of bread, and of saliva, beat into a pulp, and severally combined with an ounce of the infusions of coffee, of green tea, and the same quantity of pump water. The bottles were placed (as in the former experiment) at a proper distance from the fire, and every now and then carefully examined. A fermentation was first perceived in the standard, i. e. the mixture with pump water, which became sour in about forty-eight

eight hours. The infusion of coffee emitted few air bubbles, and continued near four days without shewing any signs of acidity. By an accident, the phial which contained the tea was broken at the beginning of the experiment.

EXPERIMENT V.

March 29th, 1772. I awoke at five o'clock in the morning with the head-ach. My pulse was hard and full, and beat 92 strokes in a minute. I drank four dishes of strong coffee. In half an hour the pain in my head was relieved; yet my pulse still continued to vibrate the same number of times, but was softer and less full. In an hour it sunk to 70. In an hour and a half it rose again to 76; and in two hours to 80, which is the standard of its frequency in health. I was in a recumbent posture during the whole time of this experiment, which I
have

have since repeated several times, under different circumstances, with no material variation in the result.

FROM these observations we may infer that coffee is slightly astringent, and antiseptic; that it moderates alimentary fermentation, and is powerfully sedative. Its action on the nervous system probably depends on the oil it contains; which receives its flavour, and is rendered mildly empyreumatic by the process of roasting. Neumann obtained by distillation from one pound of coffee, five ounces, five drachms and a half of water; six ounces and half a drachm of thick foetid oil, and four ounces and two drachms of a *caput mortuum*. And it is well known that rye, torrefied with a few almonds, which furnish the necessary proportion of oil, is now frequently employed as a substitute for these berries.

The MEDICINAL QUALITIES of coffee seem to be derived from the grateful sensation

sation which it produces in the stomach ; and from the sedative powers it exerts on the *vis vitæ*. Hence it assists digestion, and relieves the head-ach ; and is taken in large quantities, with peculiar propriety, by the Turks and Arabians, because it counteracts the narcotic effects of opium, to the use of which those nations are much addicted.

IN delicate habits it often occasions watchfulness, tremors, and many of those complaints which are denominated nervous. It has even been suspected of producing palsies, and from my own observation I should apprehend, not entirely without foundation. Slare affirms that he became paralytic by the too liberal use of coffee ; and that his disorder was removed by abstinence from that liquor.

COFFEE berries are said to be remarkably disposed to imbibe exhalations from other bodies, and thereby to acquire an adven-

adventitious and disagreeable flavour. A bottle of rum placed at some distance from a canister of coffee, so impregnated the berries in a short time as to injure their flavour. Some years since a few bags of pepper were conveyed in a coffee-ship from India, the effluvia of which being absorbed by the coffee, the whole cargo was spoiled. (a)

(a) Miller's Gardener's Dictionary, 8th. Edition, Article, COFFEE.

A REVIEW OF THE MOST IMPORTANT
CONCLUSIONS DEDUCED FROM THE
PRECEDING EXPERIMENTS.

1. COLUMBO ROOT yields its virtues most perfectly to rectified spirit of wine; and to other *menstrua* in the following order. 1. To French brandy. 2. to Madeira wine. 3. to white wine. 4. to distilled water. 5. to white wine vinegar. 6. to hard pump water.

2. THE watery infusion of Columbo root is more perishable than that of other bitters. In twenty-four hours a copious precipitation takes place in it; and in two days it becomes ropy, and even musty.

3. THE

3. THE addition of orange peel renders the infusion of Columbo root less ungrateful to the palate.

4. TWELVE ounces of Columbo root yield eight ounces and two drachms of extract, which retains the entire flavour of the root, and is equal, if not superiour in efficacy to the powder.

5. PERUVIAN bark resists the putrefaction of animal flesh more powerfully than the Columbo root; but as a preservative of the bile from putridity, this root exceeds the cortex.

6. PERUVIAN bark mixed with putrid gall, instantly produces a coagulation, and considerably increases the fœtor of it. Whereas the infusion of Columbo root unites perfectly with it, and very powerfully corrects its offensive smell. This serves in some measure to explain the ac-

tion of this remedy in the *cholera morbus*, and other diseases attended with a redundancy and depravation of the bile.

7. COLUMBO ROOT moderates, without suspending the fermentation of alimentary mixtures; prevents them from growing sour; and neutralises acidities when formed, much more completely than Peruvian bark, or chamomile flowers.

8. COLUMBO ROOT does not increase the quickness of the pulse; and may therefore be used with propriety in the *ptihisis pulmonalis*, and in hectic cases, to correct acrimony, and to strengthen the organs of digestion.

9. THE Columbo root is a useful remedy in the *cholera morbus*; in diarrhœas; in the dysentery; in bilious fevers; in a languid state of the stomach, attended with want of appetite, nausea, and indigestion; and in habitual vomitings, when
they

they proceed from a weakness or irritability of the stomach, from an irregular gout, from acidities, or from acrimonious bile.

10. The ORCHIS ROOT might be cultivated to great advantage in England, and SALEP which is a preparation of it, might be afforded at eight-pence or ten-pence per pound. Whereas foreign salep is now sold at five or six shillings per pound.

11. RICE, as an aliment, is inferior to salep; being slow of fermentation, and a very weak corrector of putrefaction. It is therefore an improper diet for hospital patients; and more particularly for sailors, in long voyages; because it seems incapable of preventing, and will not contribute much to check the progress of that fatal disease the sea scurvy.

12. CHEESE, when mellowed by age, ferments readily with flesh and water;

but separates a rancid oil, which appears to be incapable of any further change, and must, as a septic, be pernicious in the scurvy. The same objection may be urged, with still greater propriety, against the use of cheese in hospitals; because convalescents are so liable to relapses, that the slightest error of diet may occasion them.

13. SALEP has the singular property of concealing the taste of salt water; a circumstance of the highest importance at sea, when there is a scarcity of fresh water.

14. SALEP retards the acetous fermentation of milk; and consequently would be a good lithing for milk pottage, especially in large towns, where the cattle being fed upon four draft, must yield acescent milk.

15. SALEP, in a certain proportion, would be a useful and profitable addition to

to bread. For by absorbing and retaining more water than flour alone is capable of, it occasions a considerable increase of weight.

16. BUXTON WATER is found, by analysis, to contain calcareous earth, fossil alkali, and sea salt; but in very small proportions. For a gallon of the water, when evaporated, yields only twenty-four grains of sediment.

17. THE temperature of Buxton bath is 82 degrees of Farenheit's thermometer; that of St. Ann's well somewhat less.

18. BUXTON water, when drunk, quickens the pulse very considerably, and sometimes occasions the head-ach. By the fixed air which it contains, it readily dissolves iron; and such an impregnation must, in many cases, improve its medicinal virtues.

19. MATLOCK WATER is grateful to the palate, and of an agreeable warmth, but exhibits no marks of any mineral spirit. It is very slightly impregnated with *selenites*, and contains a small portion of sea salt. Some have supposed that it is a chalybeate, but without foundation.

20. THE Bristol and Matlock waters appear to resemble each other, both in their chemical and medicinal qualities.

21. MATLOCK bath raises Fahrenheit's thermometer to the 68th; the spring to the 66th. degree.

22. FIXED air may, in no inconsiderable quantity, be breathed without danger or uneasiness. And in several cases of the *ptbisis pulmonalis*, the steams of an effervescent mixture of chalk and vinegar, have been inspired with great advantage. Antiseptic fumigations and vapours have been long employed and much extolled

extolled in such disorders. But their efficacy does not appear to depend on the extrication of fixed air from their substance,

23. THERE appears to be a diversity in the properties and effects of different species of factitious air,

24. THE fixed air of metals seems to be of a kind different from that which is contained in alcalis and calcareous earth. And consequently the action of these substances as *fluxes*, cannot be explained on the principle of their restoring the air, which had been lost by calcination.

25. COMMON SALT, in the quantity of ten grains, promotes putrefaction; the *sal catharticus amarus* in the same proportion is yet more septic; but BAY SALT in this quantity resists putrefaction; and GLAUBER'S SALT exceeds in this respect even bay salt. The septic and antiseptic qualities of these salts, when used in so
minute

minute a quantity, are therefore evidently dependent on, and proportioned to their degrees of purity.

26. SEA SALT, and the bitter purging salt, though they quicken putrefaction, prevent the progress of it beyond a certain degree. A quality which must increase the usefulness of the former, as a seasoning to our food.

27. COFFEE is slightly astringent, and antiseptic; moderates alimentary fermentation, and is powerfully sedative. Its action on the nervous system probably depends on the oil it contains; which receives its flavour, and is rendered mildly empyreumatic by the process of roasting.

SELECT

S E L E C T
HISTORIES OF DISEASES,
WITH
R E M A R K S.

*Longum iter per precepta; breve et efficax
per exempla.*

SENECA.

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DIFFICULTY IN

* THE HISTORY AND CURE OF A DIFFICULTY IN DEGLUTITION OF LONG CONTINUANCE, ARISING FROM A SPASMODIC AFFECTION OF THE OESOPHAGUS.

MISS L—r, aged thirteen, a sprightly girl, of a delicate and irritable habit of body, during several years had a difficulty of swallowing; which occasionally left her for a month or two, and then suddenly returned without any apparent cause. September 3d, 1768, I was desired to visit her. She had then laboured under her disorder six or eight months without any intermission, and was reduced

* This Case was read before the College of Physicians, August 9, 1769, and is published in the Medical Transactions, Vol. 2.

duced almost to a skeleton, though she still retained her natural vivacity. When she attempted to swallow solids, they passed down readily as far as the upper orifice of the stomach; but when arrived there, they were instantly, and with a strong convulsive motion, thrown up again. Liquids sipped slowly, and swallowed leisurely, met with no resistance; but when hastily drunk, or in too large a quantity, they were quickly regurgitated. Warm liquors were swallowed with more ease than cold ones; and in the evening, the difficulty in deglutition generally abated. She complained of no other pain but an uneasy craving in her stomach; nor was there any external swelling, or inward soreness, through the whole passage of the *œsophagus*. When she was in her ninth year the *catamenia* appeared, and had recurred once or twice since that time, without any regularity. Her belly was costive, her pulse was quick and small, and her feet were usually

ally cold. She was neither of a strumous nor scorbutic habit of body; nor could her friends give me any satisfactory account of the origin or cause of her disorder.

I APPREHENDED her case to be spasmodic, complicated with a slight thickening of the *œsophagus* about the part affected, the consequence of a contraction so long continued. The following medicines were therefore prescribed.

R. *Elixir. myrrhæ comp. tinct. valerian.*
vol. aa. ʒiv. M. dentur guttæ viginti
in thea pulegii bis die.

R. *Ol. amygdal. ʒj. sp. sal. ammon. cum*
calce viva ʒvj. camphoræ oleo solutæ
ʒij. ol. succin. ʒiss. M. f. linimen-
tum, quo bene fricetur spina dorsi, a
prima cervicis vertebra usque ad duo-
deciman dorsalem, mane & vesperi quo-
tidie.

R. *Merc.*

℞. *Merc. dulcis sexies sublimat. gr. ℥ss. mucilag. gum. Arab. ℥ij. sp. nitri dulcis ℥ij. vin. antimon. gutt. vj. Aq. fontan. ℥ss. Sacchari alb. ℥j. M. f. haust. hora decubitus quotidie sumendus, vini antimonialis dosin sensim augendo.*

℞. *Extract. cort. Peruvian. mollis. castor. russic. galban. colat. aa. partes æquales, camphoræ sp. vin. rect. trit. ℥j. ol. succini. ℥j. balsam. Peruvian. q. s. M. f. emplastrum scrobiculo cordis applicandum, & semel in septimana renovandum.*

DIRECTIONS were given that her feet and legs should be kept warm ; that her drinks should not be taken cold ; that her diet should consist of broth, mutton, or beef tea, as it is called, panada, vermicelli, sago, rice, milk, chocolate, cocoa, salep, &c. that a little wine should be occasionally allowed ;

ed; that she should abstain from tea and coffee; that moderate exercise should be daily used; and that a nourishing clyster, prepared of milk, broth, &c. should be injected every morning and noon; to obviate the loosening effect of which, a few red rose leaves were ordered to be boiled in it, or a little starch to be added to it.

September 22. THE liniment, calomel draught, and clyster, had been neglected. But the plaster had been applied; she had taken the drops with regularity, and had carefully observed the regimen prescribed to her. The difficulty in deglutition was sensibly abated, her appetite was mended, and she had recovered flesh and strength.

October 1. THE mercurial draught had purged her. To prevent this effect, fifteen or twenty drops of *elixir paregoricum* were added. But a few days afterwards it occasioned a forenefs in her

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gums,

gums, and a slight salivation. The use of it was therefore discontinued.

October 21. SHE could now swallow solid food without any difficulty. Her appetite was good, her belly regular, her pulse fuller and slower, her flesh and strength recruited, and her health in every other respect was perfectly re-established. I directed her to continue the use of her medicines, and to persevere in her regimen a month or two longer; and she has ever since been entirely free from her disorder.

I SHALL beg leave to make some general observations on obstructed deglutition, without confining myself to the particular consideration of the case which has been related.

I. A DIFFICULTY in swallowing may proceed from such a variety of causes, not easy to be distinguished, and yet each requiring

requiring a particular method of cure, that the physician's practice in such cases must be uncertain and perplexed. And what adds considerably to this embarrassment is, that the effect often co-operates with the original cause, and confirms the disease. Thus a constriction of the *œsophagus*, arising from a spasmodic affection, will, if it continue long, produce either an enlargement of the glands, or a thickening of the substance of the gullet, about the part affected. On the contrary, if the stricture proceed from a glandular tumour, from schirrosities, or fungous excrescences, it will at the same time be complicated with some degree of spasm; of which amongst several instances that have fallen under my observation, I shall mention the following. A farmer's wife, aged fifty, of a strumous habit, perceived an impediment in her throat to the passage of solid food, some months before she applied for advice. Her disorder had increased by degrees, and she was then

unable to swallow any thing but liquids. A surgeon examined the gullet with a probe, and found the two glands which are situated about the fifth vertebra of the back considerably enlarged. Æther was then a fashionable remedy in this part of the country; and she was induced, by the fame of its effects, to wish a trial might be made of it. A dose properly diluted was given her, and about half an hour afterwards she had the power of swallowing, without much difficulty, a morsel of solid food. But the relief was only temporary. She relapsed in an hour or two, and had again recourse to the same remedy, which after a few trials lost all its efficacy, and the poor woman having languished about six months, died literally famished. From this and other instances, I should apprehend that the use of antispasmodics would assist the operation of the mercurial course, so judiciously recommended by Doctor Munckley in the first volume of the Medical Transactions;

actions; and would quicken, as well as render more certain, the cure of this deplorable disease.

2. IN spasmodic affections of the *æso-phagus*, external applications to the spine are likely to be very serviceable, from the contiguity of that tube to the *vertebræ*. And perhaps nothing would be more effectual in such cases than a blister, applied either to the neck or between the shoulders. That epispastics are powerful antispasmodics, experience hath fully ascertained; and where the disorder is attended with an enlargement of the substance, or a fullness of the glands of the gullet, they would have additional efficacy, by producing a copious discharge of serous humours, and by that means unloading the vessels of the part affected.

VOLATILE and antispasmodic liniments are also highly useful, as the case above recited sufficiently evinces. It is indeed

to be lamented that external applications of this kind are not more frequently employed in practice; for there is just reason to apprehend that powerful effects might be expected from them in various diseases. In the hooping cough particularly, I have observed considerable benefit to accrue from the use of a liniment, similar to the one prescribed above.

3. WHEN constrictions of the *æso-phagus*, arising from spasm, have been of long continuance, and do not yield to medicine; electricity furnishes us with no improbable means of relief. The publick indeed have been much disappointed in the medical effects of electricity. But this hath in part proceeded from the misapplication of so powerful a remedy. It appears to me, and I am confirmed in this opinion by the observation of a very eminent physician, that the electric shock bids fair to do much more good
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in diseases from rigidity, than in those from laxity. Amongst many other proofs of this, may be adduced the cure of a universal *tetanus*, the history of which is published by Doctor Watson, in one of the late volumes of the Philosophical Transactions.

4. STIMULATING vapours conveyed into the *pharynx* have a tendency to remove spasms, even when seated deep in the *œsophagus*. A few years ago an elderly gentlewoman, after eating pease, felt an uneasy sensation as if one of them stuck low down in her throat, and suddenly found herself deprived of the power of deglutition. Notwithstanding the use of a variety of remedies, her inability to swallow continued five or six days. She was directed to fumigate her throat with *assafœtida*, dissolved in a strong infusion of the aromatic herbs: and drawing in the vapours very forcibly, the spasm was in-

stantly resolved; nor has she ever since suffered the least return of it.

5. WHEN this dreadful disease is so confirmed as to be deemed incurable, the patient's life may be prolonged by the daily injection of nutritive clysters, and by bathing his feet, hands, and arms, and occasionally his whole body, in new milk, broth, decoctions of salep, sago, or vermicelli, &c. The absorption by the lymphatics of the skin is very considerable. It has been found by experiment that the hand, after being well chafed, will imbibe in a quarter of an hour near an ounce and a half of warm water. And allowing that the surface of the hand is to that of the body as one to sixty, the absorption of the whole, in the same space of time, would amount to upwards of seven pounds. The copious discharge of urine in the *diabetes*, so much exceeding in quantity the patient's drink, confirms
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in some measure this calculation. And the curious fact related by Dr. Chalmers, at the same time that it affords a further proof of the great absorption by the pores of the skin, points out to us the valuable purposes to which it may be applied in the disorder under consideration. A negro man, who had eaten or drunk but little before he was gibbeted in March, 1759, at Charles Town in South Carolina, and had nothing given him afterwards, regularly voided every morning a large quantity of urine, but discharged no more till about the same hour the next day. The dews of the evening, imbibed by the body, supplied in this case a superabundance of fluids in the night, and a sufficient quantity to support perspiration in the day. Had these fluids been of a nutritious quality, it is not improbable that, even under such circumstances, the poor negro might have been kept alive for a considerable length of time.

PROSPER

PROSPER ALPINUS relates that the Egyptian women, in order to become fat, use every day a tepid bath; and whilst they continue in it, receive nourishing clysters, and a variety of the richest foods. By this means the females of that country, particularly the Hebrew women who reside there, are for the most part immoderately corpulent. *Illarum plurimæ perinde ac sues cernuntur pinguiissimæ humi recumbentes, maximeque Hebreæ, quibus istud vitii aliis familiarius observatur.*

I HAVE not enlarged upon the necessity of conveying aliment into the body by clysters, in obstructions of the *æsophagus*, because this must be obvious to every practitioner. The other method of nutrition, if not less known, is certainly less attended to, and in general is altogether neglected. It may perhaps be thought an omission, that no notice has been taken of the administration of medicines

cines under the form of clysters, in these deplorable cases. But I apprehend, however useful they might be in many respects, they would in general too much interfere with the nourishment of the patient.

CASES

CASES

OF

DROPSIES.

CASE I.

MRS. POPPLETON, aged 33, a woman of a very delicate constitution, and subject to a *profluvium mensium*, which had greatly impaired her strength, perceived about two years ago an indolent, moveable tumour in the lower part and left side of her belly, which gradually though slowly increased. Before it acquired any considerable bulk, her right leg began to swell, her urine was voided
in

in small quantity; the symptoms of thirst and inward heat ensued; the *abdomen* became enlarged; a fluctuation was soon perceptible; and a complete *ascites* was formed.

THE tumour in the lower part of her belly, which from its situation I apprehend was an incysted dropfy of the left *ovarium*, now began to be extremely painful, the swelling of the *abdomen* increased, a general *anasarca* was coming on, and her case became every day more and more deplorable. Things were in this state, when the patient, as she arose out of bed in the morning (February 2d, 1771,) was seized with a nausea, without any apparent cause, which was soon succeeded by a violent vomiting. At three o'clock in the afternoon I was first called to her assistance, and found her quite exhausted with incessant reachings. Her pulse was so feeble as to be scarcely perceptible,

her extremities were cold, and her legs and thighs were affected with a most painful spasm. She had discharged near ten pints of water, and this evacuation had entirely removed the anasarcaous swellings, and greatly diminished the fullness and tension of the belly. The tumour of the left *ovarium*, though much decreased in bulk, was evident to the touch, and appeared to be still moveable under the fingers. Gentle cordials were directed to support the patient's strength, warm fomentations were applied to her legs and thighs, and an opiate was administered, to procure for her a short interval of rest and ease. She enjoyed a few hours refreshing sleep; the vomiting then recurred, and continued five or six days, with intermissions, which gradually became longer and longer. Her thirst during these evacuations was almost insupportable, but she refrained with great resolution from all liquids, except a little red port wine diluted with mint water. O-
ranges

ranges too were freely allowed, and were highly grateful to her. All her dropfical swellings were now removed, and the tumour of the *ovarium* itself was no longer perceptible. When the vomiting ceased, a gentle *diarrhœa* succeeded. An infusion of the bark with the *sp. nitr. dulcis.* and *tinct. mart. in sp. salis* were given. Her thirst abated, her appetite returned, and in a few weeks she recovered a tolerable degree of health and strength, and still continues free from any of her former ailments, though it is now four months from the time when her vomitings commenced. The quantity of water she discharged, exclusive of her evacuations by stool and urine, amounted to about three gallons.

THE case before us affords a striking proof of the efforts which nature exerts to relieve herself. By what secret instruments this salutary change was produced in the present instance, we may conjecture,

ture, but cannot ascertain. It is not to be supposed that the extravasated fluids passed by percolation through the coats of the stomach or intestines, and were then discharged by vomiting; because these coats in the living body are impervious to water, and transmit it only when the circulation ceases, when their vessels shrink, and the *mucus* lining the internal cavity is dried or abraded. Nor is it easy to conceive, how the hydropic cyst of the *ovarium* should thus empty itself into the ventricle; or so large a quantity of water transude with such rapidity, through the interstices of its fibres. For that the stomach was not ruptured is evident from the speedy recovery of the patient. The effect therefore must be ascribed, not to a mechanical cause, but to that vital energy which by imperceptible means regulates the motions, and corrects the disorders of the animal frame; though sometimes with a degree of violence dangerous to, and even destructive of life. In the present

present case it appears probable, that a sudden change took place in the course of circulation; the lymphatics recovered their power of absorption, and performed their office with renewed vigour; the vascular system became overloaded, and the exhalant arteries of the stomach and intestines poured forth the superfluous fluids, restoring thus the equilibrium.

INSTANCES of a sudden, and partially increased action of the vessels frequently occur, as in the *diarrhœa*, *cholera morbus*, hysteric disease, *profluvium urinæ*, &c. &c. But the following history, related by Doctor Simson, admirably illustrates, and at the same time confirms what I have advanced. *Cum homo adolescens, feбри correptus, cui accesserat diarrhœa, cum extremo stupore sensuum, nihil plane ore haurire vellet, (quamquam immoderato æstu totus torresceret) quo humectaretur, jubeo in aquam egelidam imergi pedes; quo factò, protinus aquæ mirum cerno in vase decrementum,*

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deinde

deinde ejusdem vixdum coloratæ, e vestigio impetuosam, more cataractæ, per anum effusionem. (a)

SEVERAL instances are recorded of anasarcas, and some few even of the ascites, which have been cured by vomiting. But I believe it has rarely if ever happened, at least I do not recollect such a case either in books or in practice, that a dropfy of the *ovarium* has been removed by the spontaneous efforts of nature. Deductions from singular and solitary facts, though contrary to the rules of philosophizing, are not always to be rejected; but may be allowed with proper caution and reserve, when the nature of the subject admits not of better evidence. The history before us furnishes, I apprehend, an exception to the general laws of reasoning by induction; and one instance, well authenticated, of the cure of

(a) Simson de Re Medica, p. 183.

of a disease, which the most eminent physicians have considered as irremediable, may justly lead us, in similar circumstances, to imitate by art the operations of nature; and to excite those efforts, which when spontaneous, have proved so salutary. In the incipient state of a dropfy of the *ovarium*, emetics repeatedly administered would be likely means of promoting the absorption or discharge of the incysted fluid. They produce the strongest contractions in the abdominal muscles, agitate all the viscera of the lower belly, quicken the circulation of the blood, and by their general action on the whole system, remove obstructions in the minutest and most remote series of vessels. Hence the powerful effects of Turpeth vomits in white swellings of the joints; in which the glands are at least equally diseased, and the extravasated fluid as much out of the course of the circulation, as in the species of dropfy we are now considering. But unfortunately this disorder is so infi-

dious in its attack, and so little alarming in its progress, that it becomes almost incurable before the patient is apprehensive of any degree of danger. However in its more advanced stages, emetics may be administered with safety, and sometimes perhaps with advantage. If the *morsus diaboli* adhere to the enlarged *ovarium*, and the fallopian tubes be not totally obstructed, the action of vomiting may force a passage for the fluid, and thus procure at least some temporary relief. I have now under my care a lady who has long been afflicted with a dropsy of this kind, and who has frequent discharges of bloody water from the womb, succeeded always by a diminution of bulk. A troublesome *hernia* forbids the exhibition of an emetic, which otherwise I should not hesitate to direct. Besides we may possibly be so fortunate as to co-operate with nature at the most favourable conjuncture, and by assisting her efforts, of themselves perhaps too

too languid, may effect a cure. Such instances do not unfrequently occur, in almost every species of disease; and it is upon this principle alone, that we can explain the amazing success which has attended the exhibition of remedies, by no means adequate to the effects produced by them. Mr. W. a hard drinker, when past the meridian of life, had a jaundice which was succeeded by an *ascites*, a dropfy of the *thorax*, and an *anasarca*. The prognostic was in this case extremely unfavourable, and I scarcely indulged the least hope of his recovery. Diuretics, purgatives, &c. under various forms, were assiduously administered, but with no very advantageous effects. Amongst other medicines he took pills composed of *extract. jalap. pulv. scillar. siccat.* and *merc. dulcis.* and was directed to increase the dose of these *pro re nata*. Finding the usual quantity insufficient to procure the necessary discharges, he took, if I re-

collected aright, two pills extraordinary, the consequence of which was an *hypercatharsis*, which greatly reduced his strength, but carried off all his dropfical swellings, and by the aid of cordials and corroborants, produced a perfect cure. The following curious case, communicated to me by a physician of eminence in a neighbouring town, further illustrates the observation advanced above; and at the same time shews the resources which medicine affords to a sagacious practitioner, in the most desperate stages of this disorder.

CASE II.

MISS H. of Namptwich in Cheshire, aged upwards of forty, had laboured for some time under an *ascites*, when she was removed to Liverpool in February 1769, for the benefit of medical advice. Two physicians and a surgeon were consulted, and

and after a gentle evacuation by stool, and the exhibition of a few cardiacs, it was agreed that she should be tapped without delay. Eighteen pints of water were drawn off, and two large scirrhus tumours, one nearly the size of an infant's head, the other not much less in bulk, were discovered. These she had perceived for many years, and they had succeeded a fever, imperfect in its crisis. The operation had almost proved fatal to her; her mouth was covered with *aphthæ*, and so many alarming symptoms came on, that death was hourly expected. However in a fortnight she was tolerably recovered, and in a month the *paracentesis* was again repeated. She bore it better, but soon filled again, and was obliged to submit to the operation every third week. Tired with the frequency of this painful palliative, after the fifteenth repetition of it, she requested one of her physicians in a most pressing manner, to prescribe some medicine, which might at least protract

the period of tapping. It was now the latter end of August, the weather was favourable, and he directed her to be confined to her bed for three days, to be assiduously rubbed morning and evening with dry cloths impregnated with the fumes of camphor, and to take internally the *julepum e camphora*, prepared with only two-thirds of a pint of water, and warmed with the addition of one ounce of *aqua juniperi composita*. Under this form she took a drachm of camphor daily, for the space of a fortnight. A continued gentle *diaphoresis* was the happy consequence; every day she decreased in bulk, and the abatement of her swellings encouraged her resolutely to persevere in the use of her medicine. She recovered her health, and remained near two years free from any dropfical complaints. But in the summer of 1771, her disorder recurred; and on the 16th. of July she was again tapped. On the 8th. of October following, she voided by the *anus* near twelve pints

pints of a mucilaginous liquor, in colour resembling *pus*, but without any offensive smell. After this remarkable discharge, she was better for a short time; but a violent and very painful apthous complaint, attended with a profuse spitting of viscid phlegm and saliva, then ensued; by which her strength was exhausted, and she died on the 9th. of November, quite emaciated.

ON the same day her body was opened in the presence of two physicians, and other gentlemen of the faculty; and I am favoured by Mr. Wicksted, a very ingenious surgeon at Namptwich, who attended the patient during her last illness, with the following account of the appearances on dissection.

“ ON opening the abdomen a large hard tumour presented itself, which on examination, seemed to be the right

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ovarium very much enlarged, and scirrous. It was in figure like an impregnated *uterus*, filling the lower space of the abdomen, and rising several inches above the brim of the *pelvis*. This substance, was found attached to the *uterus*, and weighed three pounds and seven ounces. By its pressure the *uterus* and bladder were forced down into the lower part of the *pelvis*; and when divided, it resembled a piece of boiled udder in colour and firmness.

THE left *ovarium* was very hard, and enlarged to the size of a goose egg. The body of the *uterus*, which with the bladder had been pressed by the weight of the tumour out of its usual situation, was hardly to be distinguished from the left *ovarium*, which was nearly of the same size and firmly united with it, and seemed to be a little diseased. The fallopian tubes were almost obliterated. The bladder and ureters were found.

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THE hydropic cyst, (which extended to the margin of the ribs, and appeared to be formed either from the distended peritonæal coats of the *ovaria*, or the duplicatures of the *peritonæum*) contained three quarters of a pint of a fluid, similar to that which had been evacuated by stool.

THE stomach and intestines were in a sound state, and no where adhered to the above-mentioned cyst. But at the bottom of the *pelvis* the cyst had a *firm attachment to the rectum* of the compass of half a crown; yet there was no visible perforation, by which so large a quantity of fluids could escape. The omentum was wasted to a membranous expansion. The kidneys, spleen, pancreas, and mesenteric glands were found. The substance of the liver was not at all diseased, but its whole convex surface was fixed by strong adhesions to the *diaphragm*. Both lobes of the lungs were found adhering to the *pleura*; their internal structure however seemed

seemed to be perfect. The heart was in a good state; and the *pericardium* contained about two ounces of limpid water."

CASE III.

MR. G. H. of Oldham, near Manchester, aged upwards of fifty, low of stature, corpulent, and habitually addicted to intemperance, in April, 1770, was afflicted with a dry cough, *dyspnœa*, *ascites*, and swelled legs. By the use of pills composed of *sapo venet.* *gum. ammoniac.* and *pulv. scillar.* and a smart mercurial cathartic, which I directed to be repeated at such intervals as not to debilitate his strength, he recovered his former state of health. But on the 2d. of January, 1771, I was again called to his assistance; he had been suddenly seized a few days before with a difficulty of breathing, which increased fast, and was then attended with a cough and frothy expectoration; his pulse

pulse was languid and oppressed, his heat natural, his face bloated, and his legs were slightly œdematous; the *abdomen* was not fuller than usual, nor had he previous to his attack, any symptoms of water in the cavity of the chest. A brisk purgative, *radix Senekæ*, *oxymel scillit.* blisters to the legs, *camphor*, *sal. volatile*, *venæsection*, &c. &c. were tried, but without effect. Respiration became more and more laborious, and in two days the patient was freed from his sufferings by death.

It appears probable to me that an *anasarca*, or infarction of the cellular membrane of the lungs, was the proximate cause of the *orthopnæa*, which in so short a time proved fatal to the unhappy patient. This disorder may, like other dropsies, arise from a general laxity of the solids, tenuity of the fluids, or obstructed circulation of the blood; but in such instances it will in all probability be slowly
and

and gradually produced. How then are we to account for its sudden and rapid formation in the case I have just related? The ancient physicians who had no opportunities of dissecting human bodies, observed in brutes, particularly in oxen, sheep, and swine, large hydatids in the lungs; and to the rupture of these, Hippocrates and Galen, reasoning from analogy, ascribed the *hydrops pectoris* in the human species. Willis and Morgagni have adopted their opinion, and confirmed the testimony of the father of physic, and his learned commentators. Morgagni says, *In sue autem, cæteroquin sano, ut cætera ejusmodi hic omittam, a me in bestiis, hominibusque conspecta, hydatidem vidisse memini, quæ minorem sui partem in pulmonis superficie ostendens, interius adeo se amplificabat, ut aquæ limpidæ uncias aliquot contineret. (a)* And another laborious anatomist

(a) Morgagni de causis & sedibus Morb. Epist. 16. Art. 36.

tomist (*Bonetus in Sepulch. Anatom. Obs.* 33 and 36,) informs us that the lungs of a man were found full of bladders, which when opened, discharged either water, or a clear liquor resembling the white of an egg. These observations I think point out the cause, and at the same time account for the rapid progress and fatal termination of the pulmonary *œdema*, under which my patient laboured. Some hydatids, contained in the cellular membrane of the lungs, were probably ruptured internally, and in an habit abounding with the *colluvies serosa*, the extravasated fluids would be every instant accumulating, and the bronchial vesicles, becoming more and more compressed, suffocation inevitably ensued.

THE diagnostics of the *hydrops pectoris*, whether the water be contained in the cellular membrane of the lungs, or in the cavity of the chest, are sometimes very obscure. Doctor Hoadly relates that he

was

was present at the dissection of a dropfical man, from the symptoms of whose disease it was with such certainty concluded, that water was contained in one side of the breast, that the only motive for examination was to determine into which cavity the fluid was extravasated. On opening his body however they discovered not a single drop of water, but found an almost total adhesion of the external coat of the lungs to the pleura; together with an inflammation, and numberless small ulcers in one lobe.

A SENSIBLE fluctuation of water in the breast is a symptom which rarely occurs, and it appears from Morgagni's observations, that it is not unusual for patients labouring under this disorder, to bear with ease a recumbent posture. But an *œdema* or dropfy of the cellular membrane of the lungs, when its attack is sudden, may often be distinguished by the following signs, although it must be acknowledged

known that they sometimes prove equivocal. The difficulty in respiration is constant, and increased by the least motion, though not much varied by different attitudes of the body; the patient complains of great anxiety about the *præcordia*, and when he attempts to take a deep inspiration, he finds it impossible to dilate his chest, and his breath seems to be suddenly stopped. The pulse is small, languid, and oppressed; the face pale and bloated; the legs usually swelled, and the whole habit is for the most part leucophlegmatic.

A DISEASE so urgent in its symptoms, so quick in its progress, and so often fatal in its termination, requires a method of cure of adequate expedition and efficacy. A brisk mercurial cathartic, which will not only unload the internal canal, but promote absorption, by stimulating and increasing the action of the whole vascular system, should be administered
N without

without delay. I have lately seen surprising relief in a very alarming case, almost instantly procured by such a remedy. (a) Blisters to the legs have also sometimes a good effect; for by destroying the cuticle, and *rete mucosum*, they discharge the water from the cellular membrane of a depending part, and thus in some degree produce a general depletion. Punctures made with a small lancet, or with such an instrument as Doctor Forthergill has lately recommended, will answer the same end; and be less liable to produce pain and inflammation. Diuretics, sudorifics, and expectorants, as they all increase the more fluid excretions, are indicated in this disease. And if the most powerful medicines of one class fail, recourse should immediately be had to another. Seneka root in liberal doses sometimes answers every intention, and operates powerfully by the skin, the kidneys, and the

(a) A similar case is recorded by Dr. Simson, in the Edin. Med. Essays, Vol. 6. p. 126.

the bronchial glands, to the great relief of the patient. But if the most active medicines prove ineffectual, and the aggravation of all the symptoms threaten almost instant dissolution, might not the *paracentesis* of the lungs be attempted with safety, and advantage? *Melius est anceps remedium quam nullum*, is an established maxim in physic, and certainly in this instance would justify the trial of an operation which is neither very painful, nor likely to be attended with any dangerous consequences. Many cases have been recorded of wounds in the lungs, which have been healed, without much difficulty. Nor have such accidents been succeeded by an *empysema*; for it may be concluded from Mr. Hewson's ingenious experiments that a puncture or incision will not occasion any emission of air, into the cavity of the *thorax*, on account of the effusion of blood, and subsequent inflammation, by which the divided vesicles are first filled, and afterwards entirely

CASE
N 2 closed.

closed. To produce a discharge of air, a laceration or superficial abrasion of the lungs seems to be necessary ; and hence it is that fractured ribs are the most frequent causes of the *emphysema*.

SHOULD the *paracentesis* of the lungs ever be deemed expedient, the chest may be perforated by cautiously dissecting with a knife, as in the operation for the *empyema*. If the lungs adhere to the *pleura* where the incision is made, they may be punctured with a lancet, and the water will thus be discharged without falling into the cavity of the *thorax* ; but a trocar will be necessary to obviate as much as possible this inconvenience, if there be no adhesion. The operation, for evident reasons, should first be performed on the right side, and if this do not afford the patient sufficient relief, another opening may be made between the seventh and eighth ribs of the left side, in order to avoid the *pericardium*.

CASE

CASE OF A PALSY, ARISING FROM
THE EFFLUVIA OF LEAD, IN WHICH
ELECTRICITY WAS SUCCESSFULLY
EMPLOYED.

ELECTRICITY, like all other active remedies, may prove injurious as well as beneficial to the human body; and it is to be regretted that experience has not yet supplied us with any certain *criteria*, by which to determine when it will be hurtful, when innocent, or efficacious. That analogy may deceive us is evident from many examples. A girl, about sixteen, who had lost the use of her arm, which was greatly wasted, became universally paralytic, after being electrified; and remained so above a fortnight.

night. The general palsy was removed by proper medicines; but the diseased arm continued as before. Electricity was again tried, and repeated three or four days, when the girl became a second time universally paralytic, and even lost the use of her tongue. By a course of medicine she was once more relieved from this additional palsy; but the original one, which affected her arm, remained incurable. (*a*) A gentleman, aged forty-eight, inclined to corpulency, and of a phlegmatic temperament, had a paralytic affection of the leg and thigh. Electricity was tried, but the slightest shocks always increased the torpor of the limb. The same gentleman, twelve months afterwards, was attacked with an *hemiplegia*. To gratify his inclination, and contrary to my own judgement, I consented to the use of electricity a second time: and this remedy, which had before proved

(*a*) Vid. *Philos. Transact.* Vol. 48, p. 786; also, *Priestley's History of Electricity*, p. 386.

proved injurious, was now at least innocent, and even thought to be beneficial to him.

THE electrical shock incautiously communicated, may be productive of dangerous and even fatal consequences. Mr. R. aged fifty, subject to various nervous and hypochondriacal complaints, after suffering several slight paralytic affections, which yielded to medicine, was at length deprived of the use of one side. Electricity, and other active remedies, were applied. Gentle shocks were repeatedly given by a skilful person; and the patient seemed to receive benefit from each operation. But by an unfortunate mistake in the position of the chain, the shock was one day conveyed through the epigastric region, and not along the paralytic arm, which rested upon it. A violent pain was instantly perceived in the stomach, which in a few minutes was succeeded by a profuse vomiting of blood. The hæ-

N 4

morrhage

morrhage continued two or three days, and so exhausted the strength of the patient, as certainly to accelerate, and perhaps to occasion his death.

PALSIES frequently succeed the *colica pictonum*, whether owing to some nervous sympathy between the bowels and the limbs, or to the translation of any morbid acrimony, cannot easily be determined. In such cases, the waters of Bath in Somersetshire are highly beneficial; and electricity, it is probable, would be a useful auxiliary to them. When the circumstances of the patient render a journey to those celebrated springs impracticable or inconvenient, the latter remedy may be tried alone with some prospect of success. Of this the following curious case, communicated to me by Dr. Withering, affords a presumptive proof,

“JOSEPH

“ JOSEPH ADAMS, aged 20, was admitted into the Stafford infirmary on the 16th. of September, 1768. Some months ago he felt a numbness and coldness in the left leg and thigh, which gradually extended all over him, his head excepted, which is now the only part he can move. His limbs are often seized with involuntary twitchings, as in the *chorea s. Vitiæ*. Pulse natural. Appetite good. Costive. This man was formerly used to work in lead mines, at which time he was often sensible of a sweet taste in his mouth; but for two years past has been employed in digging a navigable canal, and has been much exposed to wet and cold. An antimonial vomit, a mercurial purge, and an emulsion, with a large proportion of *ol. olivar.* were prescribed.

ON the 21st. He could move his right arm, and his legs a little, as he lay in bed. A number of small electrical shocks

shocks were passed through both arms, and ordered to be repeated daily.

23d. SWEATS after being electrified; is universally warmer; can stir his left arm.

24th. FEELS a tingling in his right arm. His fingers contract upon the chain, when the shock passes. The frequency of his pulse is not increased during the operation. Electrify all his limbs.

27th. CAN shut both his hands, and bring the right up to his mouth, when lying in bed; but not when raised up.

29th. FEELS the shocks more sensibly than he did at first. They always excite a strong tingling sensation. When raised upon his feet, can stand upright betwixt two assistants.

AT this time it was discovered that he had several venereal shankers, and an ulcer

cer upon the *glans penis*. The electricity was discontinued, and a course of sublimate solution, and mercurial uncti-
on entered upon; by which means all the venereal symptoms were subdued.

November 30th. His paralytic complaints being just in the same state as on the 29th. of September, recourse was again had to the electrical machine; and two large spoonfuls of *ol. olivar.* were given twice a day, to prevent costiveness.

December 18th. SWEATS when electrified; has more motion in his body; feeds himself in bed, but cannot when up. The fingers sometimes drawn inwards, so as almost to touch the palms of his hands; his arms and legs always benumbed, except for a short time after the use of the machine.

28th. PALSY much the same; for the relief gained at the time of electrify-
ing

ing ceases in a short time after it is over. Continues very costive. The antimonial vomit was repeated; a drachm of *pilul. gummos.* ordered to be taken twice in a day, with three ounces of the decoction of Peruvian bark. Omit the electricity.

January 10th, 1769. THESE medicines at first gave him stools, but they have not now that effect. The palsy in the same state. Complains of great pain in the right shoulder, and right side of the neck. A blister was applied to the neck, the pills continued, and the bark decoction changed for four ounces of paralytic infusion. An ounce of volatile liniment was ordered to be rubbed daily upon the spine; issues to be made in the thighs; and when the blister healed, a seton in his neck. He continued nearly in this method until the 12th. of April, without any other advantage than being free from his pains. He was ordered
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into the warm bath, every other day, and to take as much of the fresh leaves of cuckow pint* twice every day, as his stomach would bear.

May 3d. THE cuckow pint creates an uncommon heat in his stomach, but produces no other sensible effect. Let blisters be applied to his legs, and afterwards to the lower part of the spine.

28th. THE palsy continuing in the same state, recourse was again had to electricity.

August 21st. HAS improved, though very slowly, in strength and motion. The muscles of his back allow him to stoop, and raise himself again: the right arm nearly as strong as when in health; but for more than a week past his palsy has continued the same, and he complains of griping

* *Arum Maculatum*, *Linnaei Species Plantarum*.

gripping pains in his belly, which is tense and very costive. The usual medicines not giving him stools, let him take a large spoonful of castor oil every morning. Continue the electricity.

September 6th. FREE from the pain in his belly; the castor oil purges him considerably. Has more use in his left arm, and sweats profusely after electrifying.

13th. STOOD himself to day.

November 10th. CAN raise himself from his chair, and stand without help.

22d. WALKS about, with the assistance of his chair.

December 17th. DURING this month was a good deal afflicted with the gravel, which gave way to the usual remedies.

27th. WALKS with one stick.

January

January 3d, 1770. BEGINS to walk without a stick. From this time he continued mending until the 11th. of May; when he was discharged perfectly cured.

THE first circumstance that strikes our attention in the history of this disease is the distance of time betwixt the patient's exposure to the deleterious *effluvia* of the lead mines, and the appearance of the palsy. That the palsy was occasioned by lead is most probable; as there seemed to be through the whole of the cure, more or less of the *colica pictonum* existing. The effects of the castor oil in this disease are too evident to pass unnoticed; especially as I have heard some very ingenious and candid practitioners assert, that they have found no more purgative quality in that oil, than in an equal quantity of olive oil. The medicine they used must have been highly adulterated.

THAT electricity does not afford relief
in

in paralytic complaints, after five days application, has been asserted by a very ingenious philosopher; and I am afraid it is an opinion which has been too generally received. Dr. De Haen in his *Ratio Medendi* produces instances to the contrary; but none more striking than the above case, wherein it appears that the palsy continued in the same state, whenever the shocks were omitted. Patients are frequently discouraged by the painful sensation which large shocks excite, from persevering in an electrical course; and it is not uncommon to find, that any given degree of shock will occasion more pain in a diseased, and even in a paralytic limb, than in a sound one: I cannot omit adding, that I have never met with a case which resisted the power of small and repeated shocks, that would yield to great and terrifying strokes. Like other active and useful remedies, electricity may be given in too large a dose, and may then produce considerable mischief.

mischief. Nor are there wanting several well authenticated facts, to support this opinion. The largest shock I have ever found useful, has been from an eight ounce phial, coated in the common manner; and even this in many irritable habits, is considerably too strong. For there is an amazing difference in the sensibility of different constitutions to the electrical stimulus. Quick, lively people feel the most from it; those the least, who are dull and slow of apprehension.

A DUTCH writer of considerable merit, but not generally known in England, has recommended the use of alum in the colic piskorum, and in other obstinate and painful affections of the bowels, and has favoured the public with several well authenticated histories of its beneficial effects. (a)

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(a) De Colicæ Piskorum Treatment, & Appendix.

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CASES
OF
OBSTINATE CHOLICS,
CURED BY
THE USE OF ALUM.

A DUTCH writer of considerable merit, but not generally known in England, has recommended the use of alum in the *colica pictonum*, and in other obstinate and painful affections of the bowels, and has favoured the public with several well authenticated histories of its beneficial effects. (a)

I HAVE

(a) *De Colica Pictonum Tentamen, & Appendix*,
auctore, Joanne Grashuis, M.D.

“CURA-

OBSTINATE CHOLICS. 195

I HAVE administered this remedy in about fifteen cases; with a degree of success which confirms his testimony, and induces me to propose it to the trial of other physicians. The dose in which I have given it, has usually been, from ten to twenty

“CURATIONIS methodus (colicæ scilicet pictonum) quatuor indicationibus absolvitur. Expostulat 1. lenimen doloris, nulla habita ad causam specialem ratione. 2. Causæ proximæ vel ablationem vel extinctionem. 3. Partium affectarum in integram, quantum fieri possit, restitutionem. 4. Alvi interea temporis, difficillime in plerisque constipatæ, toto curationis decursu exsolutionem. Prima indicatio anodyna exposcit; secunda demulcentia; tertia roborantia. Sine his, levatio morbi duabus prioribus indicationibus impetrata, raro tuta fidaque est, hisce solis aliquando curatio integre absolvitur absque ullo aliorum extradietis jam indicationibus præsidio. Siquidem haud raro vidi morbum anodynus & demulcentibus, seorsum et per se, vel combinatis; sat magna copia & satis diu assumptis, vinci non potuisse: in quibus casibus omni spe sanationis impetrandæ abjecta, roborantibus fortioribus non calidis, ut intestinorum tonus relaxatus emendaretur, adhibitis, invincibilem ut videbatur hostem profigari feliciter. Quare hæc methodus a me tentata, deinceps mihi maxime commendabilis fuit; eoque felicior quo medicamentorum adstrictoria potentia major, eorumque propinatio liber alior diuturniorque.”

De Colica Pictonum, p. 48.

twenty grains, mixed with an equal proportion of sugar. When there was reason to apprehend that it might be too rough and austere in its action, I have directed it to be combined with gum arabic or *sperma ceti*: and in cases of flatulence, when a warm opiate was indicated, half a scruple of the *philonium Londinense*, made a useful addition to it. Fifteen grains of alum given every fourth, fifth, or sixth hour, for the most part prove gently aperient; and when the symptoms are not very severe, the second or third dose seldom fails to mitigate the pain, and sometimes entirely removes it. This remedy when continued for a sufficient length of time, seems to abate flatulence, to obviate spasm, to improve the appetite, and to strengthen the organs of digestion. On these tonic powers the virtues of alum must chiefly depend; though they may in part arise from its obtunding the morbid sensibility of the intestines, by an immediate action on their nerves.

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To these it is applied more quickly, forcibly, and through a larger extent than most other astringents, from its ready solubility, great stypticity, and unchangeable nature. But without discussing the mode of its operation, I shall briefly relate the two following histories, selected from several others, of its salutary effects.

C A S E I.

January 28th, 1772. MR. G. aged thirty, a temperate and active man, had been subject more than twelve months, to a violent pain in the right *hypogastrium*, which often recurred periodically and continued two or three days, leaving a yellowness of the countenance, and great foreness of the *abdomen*. His belly was moderately soluble, and his pulse regular in the short intervals of his fits. For as he lived at a distance from Manchester, I had no opportunity of seeing him in the

paroxysms of his disorder. The diagnostics of this case were obscure, but from a suspicion that his pain might be in the course of the ureter, I directed the following medicines.

R. Pulv. uvæ ursæ ʒj. Aluminis usti ʒss. M. f. Pulvis in doses 24 æquales dividendus; quarum capiat unam ter die, ex unciis tribus decocti sequentis.

R. Rad. petroselini. passular. solis. exacinat. aa ʒj. Semin. & summit. dauci sylv. herb. parietar. aa ʒss. aq. fontanæ ℥iij. coque ad ℥ij. colaturæ & adde sp. nitri dulcis ʒj. aq. junip. com. ʒiij. M.

THESE remedies were continued three weeks, and during the use of them the patient suffered no return of his disorder. The medicines proved diuretic, but he discharged no gravel, nor did his urine at this time assume any remarkable appearance.

MR.

OBSTINATE CHOLICS. 199

MR. G. now considered himself as cured, and therefore neglected the repetition of his powders. In less than a month his cholic recurred with great violence; and, April 27th, 1772, he again applied to me for advice. I prescribed fifteen grains of burnt alum, and the same quantity of sugar, to be taken twice every day, in any agreeable vehicle, during the space of seven or eight weeks. And by steadily persevering in this course, he has remained six months entirely free from his disorder.

C A S E II.

September 21st, 1772. E. P. a house-painter, aged 28, had complained several days of a violent pain in the region of the navel, attended with a slight nausea, and frequent cramps in the extremities. Sixteen hours before I saw him he had taken two doses of castor oil, which

had yet procured no stool, nor afforded any relief. He was now afflicted, during the short remissions of his cholic, with very severe pains in his arms and shoulders. His countenance was yellow; his pulse beat about seventy five strokes in a minute; and his feet were cold. I directed him to go into the warm bath in the evening; and to take the following bolus every sixth hour.

R. Spermatis ceti. aluminis rup. aa ʒj, syr. simplicis q. s. M. f. bolus.

THE pain was much abated by the use of this medicine, before he tried the warm bath.

April 27th. HE had taken seven doses of alum, and was entirely free from pain; but remained extremely costive. The bolus was therefore omitted; and a solution of the cathartic salt in barley-water was ordered to be given at proper inter-

intervals, till several stools were procured. The succeeding day he continued easy, but to prevent a relapse, I prescribed a scruple of alum mixed with an equal quantity of sugar, to be swallowed twice every day, during the following week or fortnight. The patient soon recovered his health and strength, and I have reason to believe has remained ever since free from his disorder.

W A S

SUCCESSFULLY EMPLOYED.

THE use of WARM BATHING is of great antiquity. Hippocrates recommends it in the strongest terms. Cases of *febris*, *febris cutis emolli*, *attenuat*, *doloris tollit*, *rigores*, *convulsiones*, *nervos*, *truncationes mitigat*, *capitis gravitatem*. (a) Aristotle, Pliny, Galen, and Celsus.

CASES

(a) Hippoc. Aph. 22. Sect. 2.

C A S E S

IN WHICH THE

W A R M B A T H

W A S

SUCCESSFULLY EMPLOYED.

THE use of WARM BATHING is of great antiquity. Hippocrates recommends it in the strongest terms. *Calidum, seu Therma cutim emollit, attenuat, dolores tollit, rigores, convulsiones, nervorum distensiones mitigat, capitis gravitatem solvit.* (a) Aristotle, Pliny, Galen, and Celsus,

(a) Hippoc. Aph. 22. Sect. 5.

Celsus, have given their testimony in its favour. The Romans derived this practice from the Greeks, and regarded it both as an efficacious remedy, and as one of the highest enjoyments of luxury. But under the reign of Augustus Cæsar, who was cured of a lingering and dangerous malady, by the use of cold bathing, the warm bath fell, for a short time, into disrepute. This appears from Horace :

Sane Myrteta relinqui

Diſtaque ceſſantem nervis elidere morbum

Sulfura contemni ; vicus gemit ; invidus ægris

Qui caput & ſtomachum ſupponere fontibus audent,

Cluſinis, Gabioſque petunt, & frigida rura.

Hor. Ep. xv.

VAPOUR bathing, as I am well informed, is a univerſal practice amongſt the native Indians of North America. When afflicted with the rheumatism, a diſeaſe to which, from their climate, mode of life, and rigid fibres, they are peculiarly incident,

dent, they shut themselves in a close place, and pouring water upon a large stone, heated to a sufficient degree, they expose themselves for a considerable time to the steams which arise from it. Covered with a profuse sweat, they then plunge into the cold bath; and afterwards receive the hot vapours as before, repeating for the most part twice or thrice these severe operations. A similar practice prevails in Russia and Siberia; and every person in those countries, from the sovereign, to the meanest peasant, uses twice in a day such artificial hot baths. The Abbe Chappe d'Auteroche, who travelled into Siberia in the year 1761, by order of the King of France, informs us that the heat of these baths is raised to 148, and occasionally even to 168 degrees of Fahrenheit's thermometer. In this intense heat the Russians sometimes remain two hours, pouring hot water frequently over their bodies; and then rush into the open air, dissolved in sweat, to roll themselves in
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the snow, during the most piercing frost, when the thermometer stands ten degrees below 0. Many chronic diseases are cured by this method of bathing; and the rheumatism is said to be almost unknown in Russia.

PROSPER ALPINUS relates that warm baths are used by the Egyptians, in all fevers except those of the pestilential kind; and in a variety of other disorders. They are employed also by the females of that country, especially by the Hebrew women, to render them more corpulent. “*Quod ut obtineant, multis diebus, dulcibus tepidis Balneis indulgent, in iisque diu morantes, comedunt, potant, clysteribusque ibi ex variis pinguedinibus, ac adipibus paratis utuntur, multaque etiam medicamenta per os assumunt.*”

IN England warm bathing is rarely employed in private practice, notwithstanding several modern writers of reputation

tation have strongly recommended it; and the experience of ages hath evinced its utility. To excite more attention to a remedy, which though well known is too much neglected, I shall briefly relate a few cases in which it proved eminently successful.

CASE I.

January 14th, 1770. A young gentleman, of an irritable habit, after drinking freely and swallowing a large quantity of Cayenne pepper, was seized with an inflammatory *angina*. The fever, swelling of the *fauces*, laborious respiration, difficult deglutition, and violent pain in the head, were succeeded by a delirium; and although these symptoms were in some degree mitigated by venæsection, cathartics, blisters, leeches applied to the throat, *pediluvia*, and by nitrous and antimonial medicines, yet they continued with great severity,

feverity, and the patient passed six days and nights without enjoying the least slumber. Under these circumstances (January 20th) the warm bath was prescribed, and the young gentleman directed to sit in it half an hour. The delirium soon abated; he fell into a profound and refreshing sleep, in which he continued thirteen hours; and then awoke entirely free from fever or delirium. And in a short time he recovered his usual health and strength.

C A S E II.

MASTER S. P. aged two years, healthy but of a delicate make, and with a head larger than is natural, was seized August 13th, 1771, at one o'clock in the morning, with severe convulsions. He had been slightly indisposed a day or two before, and the preceding evening a few eruptions were observed on his face and neck.

neck. His sister was just recovered from the small pox, and he had not been separated from her during her illness, so that there remained no doubt concerning the cause of these symptoms. An emetic was administered, and a laxative clyster afterwards injected. But the fits continued with great violence, recurring at shorter and shorter intervals, notwithstanding the application of a blister to the back, an antispasmodic liniment to the spine, and the assiduous use of paregoric elixir, foetid *sal volatile*, musk, camphor, the *pediluvium*, &c. The child's strength was now almost exhausted, his respiration became laborious, his extremities cold, his pulse trembling, quick and languid, and his face was alternately flushed, and of a cadaverous paleness. The variolous eruption neither increased nor receded.

SUCH was the situation of my little patient at eleven o'clock at night, when I directed him to be immersed, as high

as

as the chin, in warm water. The relief this afforded was almost instantaneous. Every convulsive motion ceased, his breathing became free and regular, he took notice of those around him, and seemed sensible of the present ease he enjoyed. He remained in the bath about ten minutes, and was much refreshed by it, but had a fit not long afterwards: This however was very slight, and yielded immediately to a clyster prepared of a strong infusion of Valerian root and assafætida, with a few drops of tinct. Thebaica which was in readiness, and should have been injected on his coming out of the water. He retained the clyster only a few minutes, but passed the rest of the night in a composed and comfortable sleep, and the next morning the eruption was universal. The pustules were distinct, but so slow in suppurating, that they died away without coming to any degree of maturity, although a cordial diet was enjoined, the bark prescribed, and small doses of sulphur,

phur, mixed with syrup of poppies, were frequently administered.

CASE III.

MRS. H. aged thirty-five, a lady of a tender constitution, subject to scorbutic eruptions, and enfeebled by frequent child bearing, received in the beginning of January 1770, a severe shock by the untimely death of an infant at the breast, which occasioned a miscarriage and profuse uterine hæmorrhage. A variety of hysterical symptoms succeeded, and gradually increased. February 18th, my assistance was desired. She was then afflicted with great languor of body, and dejection of mind, with flatulence, want of appetite, and a violent sense of suffocation in her throat. Every morning a *delirium* came on, attended with severe convulsions. Her pulse was quick, fluttering, and irregular; her skin was dry, and

and since her miscarriage free from any eruption; and she complained of an oppression about the *præcordia*. A blister to the head was directed; a cordial and nourishing diet recommended; and the frequent use of the *pediluvium* enjoined. The following medicines were also prescribed.

℞. *Affasætidæ electæ* gr. xv. *Pulv. Ipecac. extract. Thebaic.* aa gr. j. *Ol. Menthæ* gutt. ij. *syr. simp.* q. s. *M. f. Pilulæ mediocres omni nocte hora somni sumendæ.*

℞. *Pulv. Cort. Peruvian.* ʒj. *Rasur. Ligni Guaiac. Sasafraſ, Cort. Winteran. Rad. Glycyrrbiz.* aa ʒij. *Aq. Font. bullient.* ℥j. *Infunde, vafe clauſo per ſex horas, deinde cola.*

℞. *Colaturæ præſcriptæ* ʒiſs. *Tinct. Valerian. vol. Tinct. Caſtor.* aa ʒj. *M. f. Hauſtus ter die ſumendus.*

By these remedies she was much relieved, and continued better till the 12th of March; when she relapsed into all her former complaints, which recurred with an increased degree of dejection and anxiety of mind. Without my knowledge she had tried the cold bath, and had been sensibly injured by it. No eruption yet appeared on her skin; and the delirium, which was more violent than before, now invaded her always in the evening. Troches of sulphur and the compound lime water, with the pills mentioned above were at this time prescribed; and the patient was directed to use the warm bath every night, previous to the accession of the delirium.

March 13th. THE delirium recurred with much less violence, and was of shorter continuance; and after bathing the patient fell into a sound and composed sleep.

March 16th. THE warm bath was omitted, and the delirium was much more violent,

violent, and lasted longer. The following draught was directed to be taken an hour before its accession, the succeeding evening, and the use of the bath to be repeated.

R. Sagapeni, Mosch. aa gr. x. Camphoræ gr. ij. Mucilag. Gum. Arab. q. s. simul tritis gradatim adde Aquæ Menth. vulg. simp. ʒiss. Tinct. Valer. simp. ʒij. Syr. è Cort. Aurant. ʒj. M. f. Haustus.

By these means, assiduously pursued, the patient recovered her health before the end of March. Whenever the warm bath was omitted, which happened twice or thrice, she suffered sensibly by the neglect. Her delirium was more severe, and of longer duration, her sleep was shorter and less refreshing, and the succeeding day she was more troubled with anxiety of mind, oppression about the *præcordia*, and other nervous symptoms.

CASE IV.

A LEARNED and very benevolent clergyman, who resides about forty miles from Manchester, consulted me by letter in the beginning of March, 1769. He had been several years afflicted with a variety of hypochondriacal complaints, which had succeeded the sudden repulsion of an eruption on his foot, by means of an astringent bath; and he was then under a continual anxiety and distraction of mind. He had one prevailing idea constantly in his head, and one distressing image before his eyes. These symptoms of his disorder he ascribed to a violent commotion of mind, at a time when he was under great depression of spirits, and which occasioned a sudden start, or convulsive motion, in one part of his head. In this part he felt a constant and forcible spasm, which he supposed extended itself
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to his breast and bowels, as he generally perceived a sense of contraction in those parts, attended with an inward heat. His eyes were particularly affected, being drawn as it were out of their sockets, and endued with an unnatural sensibility. In a second letter dated March 11th, he informed me that he perceived every night, when he lay in bed, a continual motion from his forehead upwards, and about his temples, like the undulation of waves. The uneasiness and pain in his head was so extreme, that he could not bear even the pressure of his hat. But all this bodily pain was trifling in degree when compared to the distress of his mind, arising from the irresistible force with which external objects distracted his eyes and imagination.

UNDER these unhappy circumstances he had consulted several Physicians of great eminence, and had tried a variety

of medicines, the detail of which, as well as of those which I prescribed to him, would be equally tedious and unnecessary. Nothing had afforded him so much relief as the warm *pediluvium*, and the extract of opium, of which he had habituated himself to take ten or twelve grains every day. Medicine proving so ineffectual, I advised the gradual discontinuance of his opiates; recommended the frequent use of the warm bath; and directed hot water to be poured in a stream, upon the part of his head which was most affected. The following passages extracted from his letters, shew the beneficial consequences of this course. “ My days begin to be easier, and I have not had such bad nights since I went into the warm bath, which is near two months ago. It has wonderfully softened and composed my head, and enabled me to sleep sooner and sounder than I used to do. I have made several attempts to use the cold bath along with it, but I am always obliged to desist, as
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it immediately alters me for the worse, greatly increases the distress in my head, and renders my sleep more disturbed. I am however attempting it again; and I hope with a better prospect of success. I should be much encouraged by finding myself able to bear it; as I am persuaded it would have a happy effect in strengthening and restoring me.”—“ I find myself daily advancing towards a more perfect state of health. I have brought myself at length to bear the cold bath very well. I use it every other day, and find a very happy effect from it, in restoring my spirits and strengthening my whole frame. But it would not do without the assistance of the warm bath, which is my constant antidote against any disagreeable effects from the other, and gives me never failing relief and rest at night. The pouring warm water, in a constant stream, upon that part of my head, where my complaint lies, has I apprehend, been of singular service in softening and opening it,
and

and contributed greatly to that happy change which I find in myself. I have been gradually weaning myself from opium; and have reduced the dose from three pills to one."

THIS gentleman soon recovered his health, and has been ever since free from any returns of his disorder.

I HAVE recommended warm bathing in a variety of other complaints, and for the most part with the happiest success. Like other remedies, however, it has sometimes disappointed my expectations; and in two instances its operation proved in some degree unfavourable. The one case was a violent pain resembling the sciatica, but which I believe proceeded from an affection of the kidney. The other was a most troublesome sense of motion in the *uterus* from one side of the pelvis to the other, which occurred at the end
of

of every fortnight, in the intervals between the *catamenia*, and lasted generally three or four days. The patient was free from this complaint when in a sitting posture; and it was most uneasy to her when she was walking. The warm bath aggravated the pain in the former instance; and seemed to protract the disorder a day or two in the latter.

MISCELLANEOUS

CASES

AND

OBSERVATIONS.

1. **I**T is highly probable that Palfies frequently arise from diseases of the *viscera*, without any previous fault in the brain or spinal marrow. And considerable errors may be committed in practice, by a want of precision in distinguishing the
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the causes from which they proceed. Large evacuations are often indiscriminately directed in these disorders, from a supposition that they arise from plentitude; and thus irreparable mischief is done in those cases of weakness or irritability, which are now most numerous.

I HAVE seen several *hemiplegias* which derived their origin from affections of the liver; others from an *atonia* of the stomach and bowels; and three instances have occurred to me of Palsies from pregnancy. The following history is of this kind.

MRS. D. of Rochdale, aged 21, whose *menfes* had always recurred with regularity, but attended with great pain and general disorder, in the spring of 1771 had a miscarriage. The following August the *catamenia* did not appear at the usual period. She had a violent pain in the loins and about the *os sacrum*, which continued

tinued several hours, and was then succeeded by a pain equally acute in her head. Soon afterwards she lost all power of speech, and the use of her right side. Her habit was not plethoric, but an experienced and sensible Apothecary, before my arrival, had taken from her arm half a pound of blood, had applied a blister to her back, and a volatile liniment to the side affected. By these means she recovered in about sixteen hours the use of her side, but still complained of a *torpor* in it, and of a dull pain and confusion in her head. Her pulse was soft and natural, and her blood of a proper texture. I considered the palsy as arising from an uterine affection; and directed a gentle purgative of rhubarb and magnesia every other night, and an infusion of Peruvian bark and Valerian, to strengthen the habit of the patient, and to abate irritability. Venæsection was also recommended a few days before the next period of the *catamenia*. At the return of
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this period she had a second paralytic stroke, of the same kind as before, and preceded by the like symptoms. Venæsection had been omitted, and she had neglected her medicines. She was now evidently in a state of pregnancy. I advised a repetition of the remedies before prescribed; and recommended the use of a temperately cold bath. She complied with these injunctions, and had no return of her disorder.

2. FULLER, in his *Medicina Gymnastica*, strongly recommends COLTSFOOT in consumptive disorders. It appears to be anodyne and a corrector of acrimony; but only exerts these powers when taken in a large quantity. I gave a strong infusion of it to a young woman, who had various running sores, hectic heats, a colliquative *diarrhœa*, and wandering pains all over her body. It produced a better digestion in the ulcers, alleviated her pains, and abated the violence of the *diarrhœa*.

diarrhœa. Cicutæ, and Peruvian bark were before administered with good effect, but had been for some time discontinued, on account of their expensiveness. I thought the *tupilago* afforded more relief to the patient than either of them.

3. LARGE doses of opium have been frequently administered in painful and spasmodic diseases, not only with safety, but with the happiest success. A very learned and ingenious practitioner informs me that he lately gave to a lady in the fifth month of her pregnancy, who had an acute pain in her bowels, which threatened an abortion, twenty-two grains of the extract of opium, and three hundred drops of laudanum, in the space of thirty-six hours. And by these means, and these alone, she perfectly recovered. But the nervous system, especially in spasmodic disorders, is subject to great and sudden changes, which must sometimes render the doses of medicines, powerful in
their

their operation, uncertain and liable to produce the most dangerous effects. The following case, communicated to me by a young physician, who is likely to be an ornament to his profession, affords a striking confirmation of the truth of this observation.

A YOUTH, who was admitted into the hospital at — on account of a violent spasmodic disease, which recurred periodically in the evening, after trying a variety of remedies, was directed to take the *extractum Thebaicum* in such a quantity as might prove sufficient to mitigate the violence of the paroxysms. The dose amounted to twenty-two grains, and was repeated every night, during the space of a week, without producing any soporific effects. On the eighth night it was observed that he had no return of the spasm; and in the morning he was found dead. It is probable that a sudden alteration had taken place in the nervous system of this

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patient,

patient, and that the opium, in consequence of it, exerted with full force its usual powers on the body.

4. I HAVE lately received from a clergyman of great learning and humanity, a small quantity of seed, which is brought from the coast of Malabar, and is celebrated in the East Indies as a powerful remedy for the cholic. It is called by the Portuguese AJAVA. “ Captain B. formerly commander of the Prince Henry Indiaman, procured some of it from the Jesuit’s College at Goa, brought it over with him to England, and distributed it amongst such of his neighbours and acquaintance as were troubled with the cholic, who found great benefit from the use of it. Being himself exceedingly afflicted at times with the windy gout, and having in one of his fits applied several things in vain, he made trial of the *ajava seed*, and found it so very efficacious in expelling the wind, and removing the
gout

gout from the stomach and head, that he has ever since taken it on the like occasions. The most usual effect of it is to procure a plentiful discharge of wind, and sometimes it relieves the disorder by a stool or two." From the sensible qualities of this seed, I should judge it to be an active remedy: But I have yet had no experience of its efficacy, and I mention it only to promote an enquiry into its medicinal virtues.

5. A LADY, aged 40, was subject several years to an excessive degree of acidity in her stomach and bowels, which medicines sometimes palliated, but never cured. By degrees the acidity abated, and at length entirely ceased; but she became subject to frequent diarrhœas, to a *profluvium mensium*, and to copious and sudden discharges of urine. She complained of great feebleness, of weariness in her legs, and of a constant pain in her loins. Her pulse was languid and slow,

her skin cold, of a dark hue, and covered with freckles. She had often a putrid taste in her mouth, at which time the saliva was tinged with blood; and in the intervals of her *menses* she had a continual discharge of brown, foetid water from the *uterus*.

THESE symptoms are characteristics of a true scurvy or dissolution of the blood; which in this instance seems to have been produced by the long continuance of an acid acrimony in the first passages. Dr. Gaubius has well described the effects of such an acrimony. *Acor primis maxime viis infestus, tempore & sanguinem humoresque inde deductos subiens, nascitur ex usu diuturno acidorum aut acescentium, quæ viribus corporis non subiguntur; aut quia ex se indomabilia sunt naturæ humanæ, aut ob virtutis coëtricis impotentiam. Debilitas igitur solidorum universalis, aut privata viscerum primæ digestionis; irritabilitas regulares horum motus turbans; inertia defectusve succorum præ-*

præparantium ; circulationis & caloris naturalis languor ; neglectus motus animalis, eo disponunt, ut pateat, cui maxime ætati, sexui, vitæ generi, hoc acre frequentius eveniat. (a)

To determine the comparative nutritive powers of different foods, a few years ago a Physician, of distinguished abilities, made a variety of experiments, to which he at length fell an unfortunate sacrifice. I have been well informed that he lived a month upon bread and water only, by which he daily diminished in his weight. At the end of that time, he added sugar to his bread and water, and confined himself a fortnight longer to this diet. His breath then became offensive, his gums bled, putrid sloughs appeared in his mouth, and *vibices* spread themselves over different parts of his body. These symptoms were removed by a return to animal diet, and by the use of the bark.

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IT

(a) Gaubij Pathologia, Sect. 307.

IT is contrary to the prevailing THEORY, that vegetable food should give rise to putrefaction in the animal system; but there are many proofs of the truth of it. Doctor Bisset relates several cases of highly putrid fevers, quick in their progress and fatal in their termination, wherein the septic ferment evidently began in the *primæ viæ* after eating heartily of acedcent food. Calves also put to graze in a rich pasture, towards the close of autumn, are sometimes affected with a putrid disease, which destroys them in thirty hours. The farmers call it the *quarter felon*, because one hind quarter becomes putrid and emphysematous; and as soon as the *emphysema* extends to the spine, the animal expires: It is most incident to calves that are healthy. Juices, which are perfectly animalized or assimilated, are less prone to putrefy than such as are crude, or blended with a great proportion of acedcent chyle. The meat of bullocks and of sheep which have been kept fasting a sufficient

sufficient length of time before they are killed, that is till the recent chyle be completely assimilated, is firmer and continues sweet much longer, than the flesh of such as are slaughtered soon after taking them from their pastures. (b)

THE learned writer whom I have quoted above observes. *Dulciaria, saccharata, mellita, bisque similia, usu immodico, per occultam acrimoniam dentibus inimica sunt; pro vi sua fermentante, acidum ingenerant, et quæ ex hoc profluunt mala; præterea solvunt tenuantque humores; horum minuta densitate et firmas partes relaxant; non uno hinc nomine generi nervoso infesta, infantibus, sexui sequiori, debilibus, hystericis, hypochondriacis, obsunt. (c)*

FROM the useful and accurate experiments of Sir John Pringle it appears that

Q₄ bread,

(b) Vid. Bisset's Medical Observations, p. 85.

(c) Gaubij Pathologia, Sect. 470.

bread, water, and fresh gall, when fermented together, first turned sour, then putrid. And Doctor Bryan Robinson found that perspiration is diminished by fruit, and garden vegetables. Perhaps these facts may reflect some light on the preceding observations.

6. Mr. William White of York, the ingenious author of an Essay on the Diseases of the Bile, has lately communicated to me some curious experiments on the solution of those calculous concretions, which are called gall stones. He has discovered that *alcohol* saturated with *oleum terebinthinæ æthereum*, quickly and totally dissolves them. And induced by the powerful action of this *menstruum* out of the body, he has administered it internally with some degree of success; and is desirous of recommending it to the trial of others. Such a remedy, if it prove effectual, must be regarded as a valuable addition to the *materia medica*. But if we consider

consider the peculiar œconomy observed by nature in the circulation of the blood through the liver; the long stagnation of the bile in the gall bladder; and the quickness with which *alcohol* and oil of turpentine pass off by urine and perspiration, it is to be feared that such a *menstruum*, powerful as it may be, will scarcely reach the solvent. To this objection also we may add, that the diagnostics of the disease are often obscure and uncertain. The same gentleman informs me, that he was not long since present at the dissection of a woman, who had laboured several months under an obstinate jaundice, attended with violent and periodical pains in the region of the liver, with costiveness, white stools, and other symptoms of biliary concretions. No such cause however was found; but a large schirrus, extended itself from the *pylorus* along the *duodenum*, so as to close the orifice of the *ductus communis*, and thus prevent the passage of the bile into the intestines. But
I mean

I mean not to discourage, and wish rather to promote the trial of a medicine, which is active in its properties, and yet unlikely to prove injurious in its operation. Such experiments are justified by a maxim well known, and of undoubted authority in physic.

7. I COMMUNICATED some time ago to Doctor Priestley, the history of a putrid fever, in which the injection of mephitic air into the intestines, was attended with very beneficial effects. The Doctor has annexed it to his papers on factitious air, which will probably be published in the next volume of the Philosophical Transactions. A case, of the same kind, has very lately occurred to me; and I shall here briefly relate the most important particulars of it.

ELIZABETH GRUNDY, aged seventeen, was attacked on the 16th of December, 1772, with the usual symptoms of a con-
tinued

tinued fever. The common method of cure was pursued; but the disease increased, and soon assumed a putrid type. On the 23d, I found her labouring under a constant *delirium*, with a *subfultus tendinum*: Her skin was hot and dry, her tongue black, her thirst immoderate, and her stools were frequent, extremely offensive, and for the most part involuntary. Her pulse beat about 130 strokes in a minute; she dozed much; and was very deaf. I directed wine to be administered freely; a blister to be applied to her back; the *pediluvium* to be used several times in the day; and mephitic air to be injected, under the form of a clyster, every two hours. The next day her stools were less frequent, had lost their fœtor, and were no longer discharged involuntarily; her pulse was reduced to 110 strokes in a minute; and her *delirium* was much abated. Directions were given to repeat the clysters, and to supply the patient liberally with wine. These means were assidu-
ously

ously pursued several days ; and the young woman was so much recruited by the 28th, that the injection was discontinued. She was now quite rational, and not averse to medicine : A decoction of the Peruvian bark was therefore prescribed ; by the use of which she speedily recovered her health.

PROPOSALS

FOR ESTABLISHING MORE

ACCURATE AND COMPREHENSIVE

B I L L S

O F

M O R T A L I T Y.

Fluminis ritu feruntur.

HOR.

Fas est et ab hoste doceri.

Ovid. Metam.

PROPOSALS FOR ESTABLISHING
MORE ACCURATE AND COMPREHEN-
SIVE BILLS OF MORTALITY IN
MANCHESTER.

THE establishment of a judicious and accurate register of the births and burials, in every town and parish, would be attended with the most important advantages, medical, political, and moral. By such an institution, the increase or decrease of certain diseases; the comparative healthiness of different situations, climates, and seasons; the influence of particular trades and manufactures on longevity; with many other curious circumstances, not more interesting to Physicians,

ficians, than beneficial to mankind, would be ascertained with tolerable precision. In a political view, exact registers of human mortality are of still greater consequence, as the number of people and the progress of population in the kingdom, may in the most easy and unexceptionable manner, be deduced from them. They are the foundation likewise of all calculations concerning the values of assurances on lives, reversionary payments, and of every scheme for providing annuities for widows, and persons in old age. In a moral light also such *tables* are of evident utility, as the increase of vice or virtue may be determined, by observing the proportion which the diseases arising from luxury, intemperance, and other similar causes bear to the rest; and in what particular places distempers of this class are found to be most fatal.

A FEW examples may perhaps confirm and illustrate these observations. In the
Pais

Pais de Vaud, a district of the province of Bern in Switzerland, and in a country parish in Brandenburg, 1 in 45 of the inhabitants die annually; and at Stoke Damarell in Devonshire, 1 in 54; whereas in Vienna, and Edinburgh, the yearly mortality appears to be 1 in 20; in London 1 in 21; in Amsterdam and Rome 1 in 22; in Northampton 1 in 26; and in the parish of Holy Cross, near Shrewsbury, 1 in 33. In the Pais de Vaud, the proportion of inhabitants who attain the age of eighty, is 1 in $21\frac{1}{2}$; in Brandenburg 1 in $22\frac{1}{2}$; in Norwich 1 in 27; in Manchester 1 in 30; in London 1 in 40; and in Edinburgh 1 in 42. These facts afford a striking but melancholy proof, of the unfavourable influence of large towns on the duration of life.—From the most accurate computation, London is found to contain 601750 inhabitants; and from 1759 to 1768, the burials have exceeded the christenings every year up-

R

wards

wards of 7000; which is the recruit the metropolis requires annually from the country, to support the present number of its people. In 1757, a survey was made of Manchester and Salford. The number of inhabitants then amounted to 19839; and the burials, exclusive of those amongst Dissenters, were 778. But since that time the populousness of Manchester has considerably increased. Half of all that are born in this town die under five years old. The island of Madeira is so remarkably healthy, that two thirds of all who are born in it live to be married. Autumn is the most healthy, and summer the most sickly season there. The mortality of spring and summer, is to that of autumn and winter, as 115 to 100. In Manchester, diseases are most frequent and fatal in the months of January, February, and March; and least so in July, August, and September. The mortality of these two seasons is as 11 to 8; and of the

the first six months of the year, compared with the last six months, as 7 to 6. M. Muret, Secretary to the Oeconomical Society at Bern, informs us, that he had the curiosity to examine the register of mortality in one town, and to mark those whose deaths might be imputed to intemperance. And he found the number so great, as to incline him to believe that drunkenness is more destructive to mankind than pleurifies, fevers, or the most malignant distempers. (*a*) Such are the important uses, to which Tables of Human Mortality have been applied.

THE following plan of a more exact and comprehensive register, than has hitherto been kept, is submitted to the consideration and correction of those who

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under-

(*a*) Vid. a very valuable Treatise on Reversionary Payments, by the Rev. Dr. Price; the Bern Observations for the year 1766; Philosophical Transactions, vol. 57 and 59; and Dr. Short's new Observations.

undertake the charge of the BILLS of MORTALITY in *Manchester*.

I. LET a table of *christenings*, *marriages*, and *burials* be kept in every church, chapel, and place of religious worship in the town, and delivered at certain stated times, to the clerk of the parish church, to be formed into one general BILL, and quarterly or annually published. It is of importance that the *still born* children, and those who die before *baptism*, should also be registered; and the midwives should be desired to deliver an account of them. Perhaps the sextons may assist in ascertaining their number, as they are usually interred in church yards, or other public burial grounds.

2. LET the table of *christenings* specify the *males* and *females* who are baptized; and the table of *deaths* express the *males* who die, under the several denominations of

BILLS OF MORTALITY. 245

of children, batchelors, married men, and widowers; the *females* who die under the corresponding denominations of children, maidens, married women, and widows. An observance of these distinctions will determine the comparative number of *males* and *females* who are born; the difference between the sexes in the expectation of life; and the proportion which the annual births, deaths, and marriages bear to each other. Thus by the BILLS of MORTALITY which have been kept at Vienna, Breslaw, Dresden, Leipzig, Ratisbon, and other towns in Germany, it appears that the proportion of *males* to the *females* who are born is as 19 to 18: But the proportion of *boys* to *girls* who die under ten years of age, is as 7 to 6; and of *married men* to *married women* in Breslaw as 5 to 3; in Dresden as 4 to 1. At Vevey, in Switzerland, for 20 years, ending in 1764, there died in the first month 135,

R 3

males

males to 89 *females*; and in the first year 225, to 162. The same accounts shew likewise that both at Vevey and Berlin, the *still-born males* are to the *still-born females* as 30 to 21. In the parish of Holy Cross, Salop, an account was taken by the Vicar, A. D. 1760, of the number of *males* and *females* of the age of seventy and upwards: The latter amounted to *thirty-five*, the former only to *eight*. At Paris, and in Sweden, it has been observed, that *women* not only live longer than *men*, but that *married women* live longer than *single women*. And in Switzerland it appears particularly, from the calculations of M. Muret, that of equal numbers of *single* and *married* women, between the age of 15 and 25, more of the former died than of the latter, in the proportion of 2 to 1. (*b*)

3. LET the ages of the dead under *five*,

(*b*) Vid. Dr. Price's Observations on Reversionary Payments.

BILLS OF MORTALITY. 247

five, be specified by single years ; and afterwards, by periods of five or ten years.

4. LET the BILLS of MORTALITY contain not only a list of the diseases of which all die, but also express particularly, the number dying of each disease, in the several divisions of life and different seasons of the year. To accomplish this it will be necessary for the Physicians of the town, to consider the present list of distempers ; to reject all synonymous and obsolete terms ; and to give a short and easy explanation of those which are retained. And whenever a person dies, who has been attended by any of the faculty, the Physician, Surgeon, or Apothecary, should be desired to certify in writing the age, and distemper of the deceased.

THE following TABLES are constructed upon this PLAN ; and if the scale be

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enlarged,

enlarged, will serve for the *Church Register*, as well as for quarterly or annual publication. It appears to be unnecessary, and in many instances would be exceptionable, to insert the names of the deceased: Their *denomination* and *disease* therefore, may be expressed, in the columns allotted to each, by dots or units, which are to be summed up at the end of every three months, and set down in figures.

THE LISTS of *Marriages* and *Christenings* may be kept in the common method.

THE additional trouble which this more comprehensive and accurate REGISTER will occasion to the Clerks of the several churches, &c. may be compensated by distributing amongst them, at the discretion of any judicious clergyman, the money which arises from the sale of the quarterly BILLS. If a hundred of these

BILLS OF MORTALITY. 249

these be subscribed for, or sold at the price of one shilling each, the sum of twenty pounds per annum will thus be raised, without imposing any new burthens on the town. Every second, third, fourth, or fifth year the bills may be collected into a volume, and published, under the direction of two or more Physicians, with observations on the state of the weather, the prevalence of epidemic diseases, their symptoms and method of cure, and the increase or decrease of population during that period. Such a work will afford the most important instruction to the public; and from the profits of it, a fund may be established for the benefit of the Clerks, and the support of the institution.

N. B. It is obvious that the plan here proposed is not local, and that it may be executed with equal facility and advantage in every town and parish in
the

the kingdom.—BILLS OF MORTALITY might be rendered more useful in a political view, by taking sometimes the number of houses and inhabitants, under and above particular ages, wherever such registers are established.

the advantage in every town and parish in
may be executed with equal facility and
here proposed is not local, and that it
N. B. It is obvious that the plan

I.

T A B L E of D E A T H S.

January, February, March.

Ages.	Males.	Females.	Ages.	Bachelors.	Married Men.	Widowers.	Maidens.	Married Wo- men.	Widows.
1.			20.						
2.			25.						
3.			30.						
4.			35.						
5.			40.						
10.			45.						
15.			50.						
Total under 15.			60.						
			&c. &c.						

II.

T A B L E of D I S E A S E S.

January, February, March.

DISEASES.	1.	2.	3.	4.	5.	10.	20.	30.	40.	50.	60.	70.	80.	90.	100.
Casualties.															
Apoplexy.															
Asthma.															
Cancer.															
Chincough.															
Cholic.															
Consumption.															
Convulsions.															
&c. &c.															

A GENERAL

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T H E E N D.

ERRATA.

In various places for *hæmorrhage* read *hæmorrhage*.

Page.	Line.	
13,	3,	for <i>are</i> read <i>is</i> .
33,	last,	for <i>indisposed</i> read <i>not disposed</i> .
43,	6,	for <i>beat up</i> read <i>beaten</i> .
46,	9,	for <i>draft</i> read <i>draff</i> .
72,	9,	for <i>thirty</i> read <i>twenty</i> .
105,	2,	for <i>hasted</i> read <i>hastened</i> .
116,	12,	for <i>minute</i> read <i>small</i> .
125,	11,	for <i>beat</i> read <i>beaten</i> .
185,	9,	for <i>chorea s. vitæ</i> read <i>chorea S. Viti</i> .
224,	9,	for <i>tupilago</i> read <i>tussilago</i> .

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Essays medical and experimental

Bd.: 2. (1773).

London 1773

Med.g. 369 d-2

urn:nbn:de:bvb:12-bsb10085827-2